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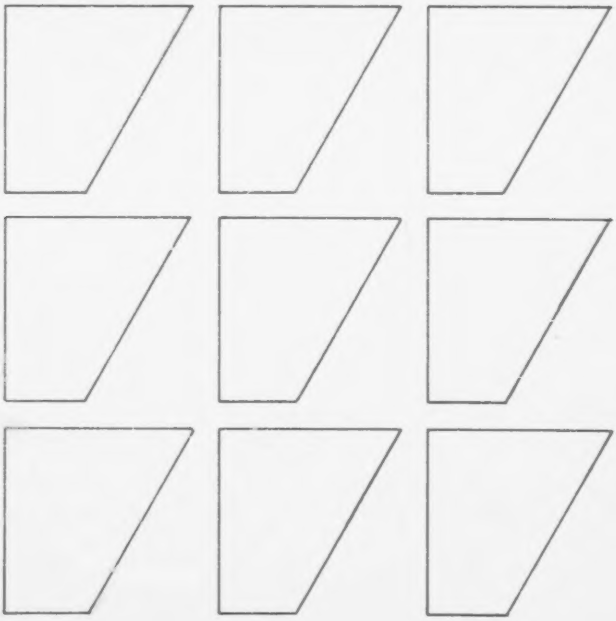
The Competitive Structure of the Eurobond Underwriting Industry

By Carol L. Courtadon



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Introduction

Since its beginning two decades ago, the Eurobond market has come to play a major role in the international flow of capital. New Eurobond issues increased from \$3.5 billion in 1970 to \$79 billion in 1984, and were over \$46 billion for the first six months of 1985 alone.[1] Not surprisingly, this growth has altered the competitive nature of the Eurobond underwriting industry. At least 122 organizations from 19 countries worldwide acted as lead managers of new Eurobond issues in 1983,[2] and many more were involved in new issues at the underwriter and selling group levels. These underwriters earned—in a conservative estimate—over \$945 million in aggregate total commissions (prior to reallowances).[3] With so many players in an increasingly large and complex market, information regarding trends in underwriter activity, profitability, and strategic directions is increasingly valuable. Understanding the changing dynamics shaping the competitive structure of this industry is also increasingly important.

Never in the Eurobond market's history have the forces influencing these dynamics been so numerous or their potential impact so far reaching as during the past five years. During this time, an increasingly volatile interest and exchange rate environment coupled with growing competition for mandates has eroded borrower loyalty, decreased underwriting revenues and fundamentally altered the traditional distribution process. As a result, the competitive conditions faced by Eurobond underwriters and the competitive strengths necessary to succeed in winning mandates have changed.

The purpose of this study is twofold: (1) to systematically identify the shifts since 1979 in market share, borrower loyalty, and the economic rents available to underwriters, and to identify the conditions giving rise to these changes; and, (2) to use this information to assess the major factors shaping future competitive conditions in the Eurobond underwriting industry.

The analysis is divided into three sections. In Section I we examine the traditional pricing structure and distribution process, and consider in general terms how and why these practices have changed in recent years. Section II extends the analysis in a detailed empirical examination of market share, borrower loyalty and underwriting commissions during the period since 1979. The conclusion of Section II uses the market share and borrower loyalty analyses as a basis for examining the relationship between competitive structure and the economic rents available to underwriters during the period. The final section discusses implications of our results for the competitive structure of the Eurobond underwriting industry, and explores potential future trends.

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[1] Morgan Guaranty Trust Co., *International Financial Markets*, various issues; O.E.C.D., *Financial Statistics*, various issues; *Wall Street Journal*, "U.S. Change in Rule on Withholding is Reshaping Eurodollar Bond Market," May 24, 1985, Eastern edition.

[2] Per information derived from the *Euromoney Syndication Guide*, 1983.

[3] The 1983 average total commission of 1.95% was multiplied by new issue volume of \$48.5 billion to derive this estimate.

I. Eurobond Pricing and Distribution

The traditional method of Eurobond distribution involves placing the bonds with end investors via a syndicate of financial institutions. Understanding the structure of the syndicate, fee structure for syndicate members, and procedures followed in the course of a traditional syndication is important to understanding the weaknesses in the traditonal system giving rise to recent changes.

A. Syndicate structure and fees[4]

The Eurobond syndicate is traditionally comprised of two types of institution: those willing to commit capital to the distribution of an issue, and those simply willing to act as middlemen arranging final placement for the bonds. Within the first group different roles are established depending upon the extent of administrative responsibility taken and the degree of capital commitment:

> *Lead managers* are responsible for the overall administration of the syndication. They take the primary role in pricing decisions, in determining the allotment of bonds to sydicate members, and in providing an orderly market for the issue by supporting its price as necessary during the distribution process. Lead managers also agree to support the issue in secondary trading.
>
> *Co-managers* fulfill a function similar to that of the lead manager, but with fewer administrative responsibilities and in a role secondary to the lead manager.
>
> *Underwriters* do not directly commit capital to support the issue price, but agree to purchase a certain number of bonds (the "commitment") if the issue is not placed entirely.

The second group, those not committing capital to the issue, is comprised of *selling group members* which do not agree to a minimum commitment but contribute only their placing power.

Due to these differences in responsibility for administration and capital commitment, the structure of underwriting and placement fees is traditionally tiered according to syndicate members' roles. Until the late 1970's (when competition began to increase significantly, new distribution techniques became more common, and the effects of these changes on commissions became widespread), these fees were fairly standard. Total commissions varied between 2.0% and 2.5% depending upon the maturity of the issue, as follows:[5]

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[4] This subsection draws heavily on the discussion of the traditional process of Eurobond syndication in Fisher, Frederick G., *The Eurodollar Bond Market*, Euromoney Publications, 1979, Ch. 5-7.

	Maturity 5 Years	 7 Years	 10+ Years
Management fee	0.375%	0.375%	0.5%
Underwriting fee	0.375%	0.375%	0.5%
Selling commission	1.250%	1.500%	1.5%
Total commissions	2.0%	2.25%	2.5%

Three points must be noted regarding this traditional fee structure. First, the management fee is generally not split equally between managers and co-managers. Lead managers take a share (the "praecipium") for themselves before dividing the remainder among all managers. Secondly, the underwriting fee is earned by all syndicate members performing an underwriting function. It is paid to lead managers, co-managers and underwriters in proportion to their commitments. Finally, the selling commission is paid to all members that actually place bonds—managers, underwriters, and selling group members.

The traditional procedure for a Eurobond offering involves three major steps: (1) announcement of the issue and the initial offering period; (2) formal pricing of the issue; and, (3) the price stabilization period prior to free trading of the bonds. During the first period, which could last from seven to ten days, the syndicate is established and members inform the lead manager of their estimated demand for the issue. At the formal pricing date market conditions are reviewed and the final price is set with the borrower. Once the underwriting or subscription agreement is signed, syndicate members are notified of their allotments. Formal pricing is followed by a price stabilization period during which the lead manager maintains prices quoted for the bonds within a narrow range to ensure smooth placement. Free trading begins when the initial distribution is deemed complete.

B. Weaknesses in the traditional distribution process

Several weaknesses must be noted in the process. First, in order to ensure continuing inclusion in Eurobond syndicates, syndicate members with weak placing power have incentive to overstate demand to the lead manager during the offering period. Since strong placing power is a primary reason for lead managers to include members in a syndicate, these syndicate members will not want the lead manager or borrower to realize their weakness. The solution is to take more bonds than customers demand, and either sell the excess bonds to other members (excluding the lead manager) through third party dealers, or wait and "dump" excess bonds in the secondary market after pricing is completed.[6] The problems of pre-trading and dumping could also arise from syndicate member fears of losses on issues that were not properly priced.

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[5] *Ibid.*, p.58.

The traditional distribution process gives lead managers two main methods of controlling such activity: by carefully analyzing the quality of the demand reflected during the offering period and adjusting the allotment decision accordingly, and by actively buying or selling during the stabilization period to support the price and limit the need for dumping. This is necessary, first, to save the borrower from the embarassment of steep price declines and erratic price performance. Secondly, inhibiting the discounting of bond prices during distribution is important to maintaining borrower and underwriter relations with investors who bought at the issuing price. The costs of supporting bond prices during the stabilization period are typically charged to a joint management group account (the "stabilization account"), and netted against the group's commissions.

Ironically, the above control methods are, themselves, critical weaknesses in the traditional syndication process. In the traditional procedure, members are not notified of their actual allotment until the pricing date (after the price has been set and accepted by the syndicate member) since regulating the total allotments given to members is one way in which the lead manager may support the issue price. The consequence, however, is a high degree of uncertainty among syndicate members regarding the actual amount of their allotment. Such uncertainty increases the incentive to pretrade the bonds in cases where syndicate members fear over-allotment and over pricing. At the same time, difficulty in accurately pricing the bonds is exacerbated by the practice of not asking underwriters to take their entire commitments. To the extent that syndicate members know they are not likely to receive their entire commitment, demand is overstated. This overstatement could be quite large since members often did not expect to receive more than half of their commitment. Of course, in setting the issue price the lead manager considers other factors such as secondary market conditions for similar issues and general primary market conditions. Nevertheless, overstated demand from syndicate members certainly affected the accuracy of Eurobond pricing.

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[6] This unauthorized trading can be accomplished without the lead manager or borrower knowing the seller's identity, since Eurobonds are bearer bonds and the security numbers are not recorded in a systematic way—bonds of the same issue are pooled together by the clearing house, and drawn out randomly for delivery. Hence there is no "trail" for identifying syndicate members engaging in this practice.

A second area of weakness in the traditional process is the extended time involved in pricing the issue and completing its initial distribution. This procedure did not allow for flexibility in more volatile interest and exchange rate environments, where borrowers often need to bring issues to market within very brief windows in order to find the best terms. This weakness has led to significant changes in the distribution process in the past few years.

Finally, the inflated level of Eurobond underwriting fees and commissions at the end of the 1970's was itself a major factor shaping subsequent changes in the syndication process. While average total commissions in the U.S. market in the late 1970's were between 0.6% and 1.5%, Eurobond commissions averaged 2.0 to 2.5%. Yet 1975-1977 was a period of unprecedented growth in the Eurobond market which brought with it increasing competition for mandates. The new distribution techniques which evolved around the first three (structural) weaknesses of the traditional system were strongly motivated by pressure on the industry to adjust its commission levels.

It is important to note that when the lead manager proposed pricing terms to the borrower that were unrealistically low in view of the market, it was effectively proposing to reduce the commission levels on the issue. For example, say the management group prices the bonds at par knowing that a fair market price would be 98 given the coupon rate, maturity, rating and the market's perception of the borrower. The result is lower cost to the borrower by its receipt of both a lower coupon rate and the full par price. The difference between the borrower's cost and true market value is paid by the syndicate via its losses on placement of the bonds. In addition, the cost of supporting poorly priced issues reduces commissions via the syndication account. If the price set by the management group overvalues the bonds sufficiently, the entire underwriting and management commission can be wiped out. This has occurred frequently in the market since the late 1970's.[7]

The lead manager has strong incentive to allow the adjustment of commissions to occur in this way rather than in a formal manner because of the fee structure for the syndicate. With the lead manager's praecipium (which is earned on the entire issue amount), plus its share of the management and underwriting fees, substantial discounting and market intervention to support the bond prices can occur before the lead manager's fees are wiped out. More importantly, substantially reducing formal commissions would remove what cushion managers and underwriters have against poor pricing. Invitations to participate in such a syndication would be refused by prospective co-managers and underwriters. On the other hand, motives for participating in Eurobond syndicates such as exposure to the market continued to attract underwriters and co-managers to participate in traditional syndications despite reduced levels of revenues. Lead managers could be fairly certain that co-managers and underwriters would not pull out of issues even if they felt they were mispriced. These weaknesses in the fee structure combined with more volatile market conditions in the early 1980's to produce the first fundamental change in the traditional distribution technique: the emergence of the gray market.

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[7] Discounts of 1.625% to 2.0% have been common, and examples up to 3.0% were cited by Fisher in 1979. See: Hanna, J. and S. Staley, *The International Bond Manual--U.S. Dollar*, Salomon Brothers, May 1983; Faith, N., "The Death of the Selling Goup Member," *Euromoney*, February 1981; and, Fisher, Frederick G., *The Eurodollar Bond Market*, Euromoney Publications, 1979.

C. Emergence of the Gray Market and New Distribution Techniques

The structural weaknesses in the traditional syndication process were brought to the forefront in the late 1970's and early 1980's. As lead managers cut the coupon rates proposed to borrowers beyond realistic levels in response to competitive pressures, volatile and rising interest rates increased the incentive for underwriters and managers to protect themselves against the costs of carrying mispriced issues as inventory or having to sell such issues at a deep loss in the secondary market after pricing was completed.

The result was an increased level of trading via third parties prior to the receipt of official allotments. Although this poses certain risks for the managers and underwriters who engage in it, it also provides a way to limit losses from declining bond prices and to avoid the need to carry expensive inventories of unplaced bonds. Not surprisingly, this "pre-trading" market grew as increasing numbers of dealers saw the profits to be made there. Stabilization of the issue price became more difficult, especially for issues judged by this emerging pre-market to be priced inaccurately. Because of this, and also because of the competitive pressure to avoid admitting a lack of placing power, managers and underwriters would not admit to using the premarket despite the fact that its use was increasingly common.[8] It was this that gave the market the name "gray market" in the early 1980's.

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[8] See: Anderson, Tim, "How the Grey Market Became Respectable," *Euronomey*, May 1982.

By 1980, as the number and size of Eurobond issues increased, the role of the gray market in redistribution became increasingly important. At the same time, the first formally publicized gray market quotes were placed on a Reuters screen by a single firm in the Eurobond market.[9] This was followed slowly by other firms offering Reuters quotes. As borrowers and investors increasingly referred to gray market prices in evaluating Eurobond market activity, increasing numbers of investment houses decided to become visibly active in the gray market.

The result has been increasing recognition of the gray market, though acceptance of its practices today are far from universal. Conflicts remain between primary issuing houses and gray market dealers. Lead managers argue that they make the largest capital commitments to the market, while gray market dealers reap a disproportionate amount of the profits. In addition, the gray market is criticized for artificially discounting new issues and then failing to stand by the prices quoted.[10] In addition, lead managers and underwriters have differed over the fairness of the underwriting fee, with critics arguing that underwriters who overstate their commitments are being paid for a guarantee that they are not prepared to honor. Syndicate members, meanwhile, have blamed poor pricing by lead managers for the breakdown of syndicate discipline via pre-trading and dumping. Gray market participants argue that this market simply allows the inevitable price adjustment for poorly priced issues to occur earlier, and with less cost to co-managers, than under the traditional process.

It should be noted that lead managers can counter-act what they view as artificial gray market pricing by methods other than intervening in the gray market to support the issue. One technique for this which has been used successfully is for the lead manager to withhold allotments, selling the bonds itself and forcing short sellers in the gray market to scramble for bonds (bidding up the price).[11] Strong lead managers can thereby impose some discipline on gray market activity, giving co-managers and underwriters incentive not to simply unload expected allotments.

In addition, in an effort to impose some discipline on lead managers and to make the issuing process more orderly, the International Primary Markets Association issued its first set of guidelines in early 1985.[12] These guidelines emphasize correct pricing by lead managers and place the financial burden of incorrectly priced issues on the lead manager instead of the co-management group. This is accomplished by making all losses in the stabilization account above the underwriting fees the responsibility of the lead manager. Legal and administrative costs are stipulated to be for the borrower's account, not for that of the syndicate. In this way, correct pricing is expected to be encouraged and more orderly distribution enhanced.

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[9] The firm was Ross and Partners. Its history with respect to the gray market is noted in Andersen, Tim, "How the Grey Market Became Respectable," *Euromoney*, May 1982 and in Nigel, A., "The Day Mattle Gave the Grey Market a Bear Hug," *Euromoney*, January 1981.

[10] With no outside or industry self-governing body to regulate these practices, dealers in the gray market are not held to the quotes that they offer.

[11] See: Andersen, Tim, "How the Grey Market Became Respectable," *Euromoney*, May 1982 and Nigel, A., "The Day Mattle Gave the Grey Market a Bear Hug."—*Euromoney*, January 1981.

It should also be noted that factors other than borrower pressure on lead managers contributed to the development of the gray market and its growing acceptance as part of the syndication process. First, the sheer size of syndicates grew strongly during the 1970's, prompted by the growth in the Eurobond market and the relatively high commissions available there. By the late 1970's, underwriter and selling groups of 300 were not uncommon for large issues,[13] leaving lead manager control of the syndicate drastically reduced. Secondly, investor pressure has contributed to pre-market discounting as institutional investors have grown in importance in the Eurobond market. These investors, sophisticated enough to see that inflated syndicate commissions were being passed on to them via overvalued bonds, have the bargaining power to require discounting. In addition, because management groups have the right to pre-sell the issue to institutional investors, underwriters can find their commissions eroded even before the start of secondary market trading. As gray market prices have became more widely available, some retail investors have also tightened their investment criteria. Finally, the rise of the gray market is related to the demand for increased speed in bringing issues to market to take advantage of brief windows in the market. This has decreased the time available for careful selection of underwriters, a step which was critical to the success of a traditional syndication. In the absence of early innovative changes in syndicate structure, the gray market stepped in to provide a mechanism for redistributing bonds from those unable to place them to those who were able to do so.

More recently, the same factors have brought other changes in traditional syndicate structure. By 1981, the reduced level of effective commissions due to mispricing had taken its toll on syndicate participation. As the effective level of commissions declined, the number of institutions willing to participate as underwriters and selling group members also fell.[14] New syndication techniques reducing syndicate size and increasing the speed of bringing issues to market were needed, and such a technique was developed in the form of the bought deal.

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[12] See: "Eurobond Discipline," *Euromoney Corporate Finance*, April 1985.

[13] Fisher, Frederick G., *The Eurodollar Bond Market*, Euromoney Publications, 1979, p.69.

[14] See, for example: Faith, N., "The Death of the Selling Group Member," *Euromoney*, February 1981.

In a bought deal, the lead manager or a group of lead managers approach the borrower with a firm bid. The bid cites issue amount, coupon, and price, and allows only a few hours for the borrower to accept or reject these terms. If accepted, the issue is bought by the lead manager(s). In lieu of forming a syndicate, the managers may sell parts of their share to other investment houses for resale to end investors; however, since the incentive to do so generally occurs in unfavorable markets where the risk of purchasers dumping their bonds on the secondary market is high, managers generally preplace these issues with institutional investors even before the bid is made. Because it by-passes the underwriter group used in a traditional issue, the bought deal requries strong managers with large capital availability and extensive placing power.

The effects of a bought deal vs. a traditional syndication are mixed. In a rising interest rate environment, the borrower benefits by locking in its terms quickly once the decision to borrow has been made. In addition, when underwriters are able to purchase participations from the management group these participations are for a stated amount and a fixed price, alleviating the uncertainty associated with the traditional technique. The problem for underwriters is that inclusion in such deals is the exception rather than the rule. The problem for lead managers and borrowers is that both lose the flexibility afforded by the offering period to adjust the issue price or to decide to withdraw the issue if necessary. In addition, the bought deal focuses primarily on institutional rather than retail investors. Thus issues brought to market via a bought deal will be subject to tighter pricing with less room for commissions than traditionally syndicated issues.

In response to some of these weaknesses in the bought deal a hybrid method call a "pre-priced" offering was developed. In such an offering the lead manager's bid is contingent upon its ability to form a management group for the issue. Borrowers can refuse any change in the proposed terms necessary for the group's formation. The period for formation of the group is generally from two to four days, retaining some time for adjustment while shortening the time frame from that of the traditional process. After the group is formed, it buys the issue from the borrower as in a bought deal. This technique has been used extensively in the Eurobond market, and its use is increasing.

A third innovation is more recent and seems to have evolved primarily as a response to the gray market. This syndication technique attempts to deal with the problem of the lack of syndicate control associated with large issues and the need for global syndication of "jumbo" Eurobond issues. Rather than establishing one broad syndicate to cover many geographical areas, the syndicate is broken down into several regional groups, each with a strong set of managers at its head. This technique was introduced by Credit Suisse First Boston in an $800 million offering for Texaco, with the syndicate broken down as follows:

—*Swiss placements:* CSFB, Union Bank of Switzerland, and Swiss Bank Corp. International;

—*West German placements:* Deutsche Bank, Dresdner Bank, and Commerzbank;

—*Far East placements:* Nomura International

—*U.S. placements:* CSFB, Morgan Stanley, and Goldman Sachs

For each area, the banks named above were given the responsibility for organizing and selling their portion of the issue. The groups were organized in mid-March, 1984 and the issue was completely sold and trading at a premium by mid-April.[15]

D. Effects of the Changing Distribution System on Commissions and on the Competitive Structure of the Underwriting Industry

Several major effects of the changes described above should be noted. First, the effective revenues earned by all participants have declined sharply. As we shall see in Section II, stated total commissions have fallen to an average of 1.95%, while reallowances can be estimated to average between 1.0% and 1.5%.[16] This makes the net average commissions approximately 0.45% to 0.95%.

Regarding the competitive structure of the industy, it is clear from the evolution in the distribution process that lead manager strength in terms of capital and placing power will be increasingly important to the success of Eurobond offerings. Given this, we should expect to find increasing consolidation of market share among a few top lead managers. Secondly, as the increasing availability of gray market price information has allowed borrowers to more easily compare the performance of various lead managers, we should expect to see a decline in borrower loyalty to their traditional lead managers over the past several years. Third, the erosion of the underwriter's role can be seen in the syndication of issues without use of an underwriter group in the traditional sense. Recently, a $200 million U.S. domestic bond issue was brought to the market by the Student Loan Marketing Association with no investment houses at all listed in the tombstone.[17] The announcement simply read: ". . . this offering is made by the Student Loan Marketing Assocation with the assistance of a nationwide Selling Group of recognized dealers in securities." As borrowers and investors become increasingly sophisticated and the process of Eurobond issuing more integrated (i.e., as primary, secondary and "gray" market distinctions are reduced), the pressure will be great for further consolidation in the Eurobond underwriting industry.

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[15] See: Schutt, David, "The Bold New Look in Trading," *Institutional Investor*, May 1984.

[16] This is the reallowance amount for Eurodollar bonds. For dollar FRN's, reallowances of 0.5% to 1.5% are common. Data for the other sectors of the market are not available, however since the dollar sector is the largest we take these figures as representative. Reallowance figures are from: Hanna, J. and S. Staley, *The International Bond Manual—U.S. Dollar*, Salomon Brothers, May 1983, p.14.

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[17] Curtin, Donal, "Now It's Grown Up, It's Fierce," *Euromoney*, June 1984, p.72.

II. Lead Manager Market Share, Borrower Loyalty and Effects on Profitability, 1979-1984

In the preceding section we explored the general trends influencing pricing and distribution in the Eurobond market. In this section we examine the effects of these developments in detail by empirically assessing market share, borrower loyalty and lead manager revenues from 1979 to 1984. The focus of this analysis is threefold:

(1) to systematically measure changes in the competitive structure of the Eurobond underwriting industry, as reflected in lead manager market share and in borrower loyalty;

(2) to determine the extent to which the industry's pricing structure has been affected by changes in the competitive structure; and,

(3) based on this information and on that of Section I, to assess the potential future trends faced by the industry.

The first two of these factors are discussed in parts (A) through (D) of this section. The third will be the subject of part (E).

A. Methodology

The results presented in this section are derived using the terms of all publicly announced Eurobond issues from January 1, 1979 through December 31, 1983. A total of 2,053 Eurobond issues are represented. Information has been drawn primarily from the *Euromoney Syndication Guide*, 1979-1983, supplemented by the following sources: *Financial Statistics*, O.E.C.D., 1979-1984, various issues; *International Financial Statistics*, I.M.F., 1979-1984, various issues; and *Euromoney* magazine, 1979-1983, various issues.

It should be noted that the 1979 results included may exclude significant portions of the private placement market and, while publicly announced private placements are included in later years, the detailed information used in the study is often lacking for such placements. Our conclusions will therefore be most representative of the public offering sector of the Eurobond market, and only weakly applicable to the private placement sector. In addition, despite efforts to gather complete data for each issue, some areas remain for which complete information was unavailable. All categories of information except the revenues data are at least 95% complete in all years. Results concerning market composition and market share are therefore quite reliable. Data concerning fees and commissions vary between 80% and 90% in completeness. It is important to note, however, that the unavailable information does not appear to be concentrated in any particular segment of the market. The results would be skewed only if the failure to publish fees and commission is consistently related to revenues that are abnormally low or high. This is certainly possible; unfortunately, it is impossible to evaluate whether either bias is present. We can be sure, however, that if any such bias is present it will not change significantly from year to year, or over the brief time span included in this analysis. Therefore, while absolute levels of commission revenues may be skewed up or down, the trends in these revenues are not likely to be significantly affected by an bias in the reporting of commissions. These results are therefore acceptable as a general indicator of revenue trends.

Measurement of market share. The two measures generally used in industry studies for determining market share are the subject's share of total industry revenues and/or the subject's share of total units sold. The assessment of market share used in this study corresponds to the units sold approach: it is based on the subject's share of the volume of new issues lead managed. Volume is assessed by both the dollar value and the number of issues lead managed.

This approach has two major advantages over measuring market share by the subject's share of total industry revenues. First, a measure based solely on the volume of new issues lead managed, and not on the revenues earned from those lead managements, allows us to separate market share and revenue trends. Secondly, an accurate measurement of the subject's share of lead management revenues would be impossible since two important factors affecting these revenues are not made public for each issue and each lead manager: the actual amount placed by the lead manager (which determines the underwriting and selling fees earned above the lead management fee); and, the reallowances given to investors (which reduce the lead manager's revenues).

A key problem in assessing lead manager market share in the Eurobond market is how to account for co-lead management positions. This study handles co-lead management as follows. In assessing the *dollar volume of issues* attributable to each subject, sole lead managers receive credit for 100% of the issue and co-lead managers receive credit in equal proportions. When compared to the total dollar volume of issues represented, this measures each lead manager's share of the total dollar base of Eurobond business that came to market during the year. Measures assessing the *number of issues* lead managed are constructed in two ways. First, as with the dollar volume of issues, lead manager shares are weighted to account for co-management positions, with equal weights to co-lead managers and full weight to sole lead managers. When compared to the total number of issues represented, this measures the lead manager's share of the mandates awarded for issues brought to market during the year. Secondly, lead managers were assigned one full issue for each lead management position held, regardless of the number of lead managers involved in the issue. When compared to the total number of issues represented, this measures the proportion of Eurobond issues in which each individual lead manager has been involved, and is a valuable measure of individual lead manager activity in the Eurobond market.[18] However, the latter method does not give an accurate measure of market share, and is especially inaccurate when used to determine the aggregate market share for groups of lead managers. Because of the multiple-counting inherent in this method, aggregate market share for the top 25 lead managers calculated using this method exceeds 100%.[19] It is important to note that this measure has been used in Eurobond market publications to assess the aggregate market share represented by groups of lead managers. The weighted calculation is a preferable measure of aggregate market share because it avoids this multiple counting, and more accurately reflects the distribution of Eurobond market business among lead managers.[20]

B. Lead Manager Market Share—Concentration and Competition in the Eurobond Underwriting Industry

When an industry's market share is highly concentrated in a relatively small number of producers and has remained so for several years, and when the products of various firms are identical or close substitutes, the market for that industry's products is defined as oligopolistic.[21] Rivalry between firms is most direct and active in such a marketplace, and competition can be aggressive and intense.[22] Participants in the Eurobond underwriting industry have clearly faced an oligopolistic marketplace during the past few years. However, the competitive environment has not remained unchanged: as the primary market has grown, competition has clearly intensified. The changes that have occurred during the past few years have altered both the competitive atmosphere of the industry and the industry's more objectively ascertainable competitive features, such as the distribution of market share, the extent of borrower loyalty to lead managers, and pricing. All of these changes have important implications for the future of the underwriting industry.

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[18] This measure is used in the study to report the absolute number of issues lead managed by each manager. Lead managers' proportionate shares of the total number of Eurobond issues brought to market are reported in the study using both weighted and non-weighted measures.

[19] Based on the weighted number of issues lead managed, market share for the top 10 lead managers in 1983 was 37.3% and for the top 25 was 66.7%. This compares to 73.2% for the top 10 and 130.9% for the top 25 when measured using the non-weighted method. Results for the years 1979 to 1982 were similar.

[20] As noted above, these two measures together provide the best view of lead manager activity in the market.

[21] Baumol, Wm. J. and Blinder, Alan S., *Economics: Principles and Policy*, Harcourt Brace Jovanovich, 1979, pp. 427-432 and Samuelson, Paul A., *Economics*, McGraw-Hill, 1976, 10th Edition, pp. 512-517.

[22] *Ibid.*

We begin in part (B) by examining market share in the Eurobond underwriting market as a whole and in the three major instrument sectors (FRN's, straight bonds and convertible and warrant issues). Part (C) examines changes in borrower loyalty and in the importance of specific lead manager expertise as a competitive advantage. Finally, revenue trends from 1979 through 1983 are examined in part (D) for the market as a whole and for these major instrument sectors.

1. Market Share Concentration Among the Top 25 Lead Managers

The growth of the Eurobond primary market after 1979 encouraged the entry of new lead managers. The number of lead managers participating in new Eurobond issues rose from 98 in 1979 to 127 in 1980, then fell slightly to 122 by 1983. This rise in the number of players clearly has occurred at the lower tiers of Eurobond lead manager activity: while the total number of lead managers rose from 98 to 122, the number commanding a market share of 1% or more remained virtually the same in 1983 as it had been in 1979 (25 lead managers).

Despite this increase in the number of active Eurobond lead managers, market share has remained concentrated in the top 25. This is illustrated in Table 1. This table presents the aggregate market share for the top 3, 5, 10, 15 and 25 lead managers from 1979 to 1984, as well as the marginal market share represented by each individual tier in the top 25 group. It is clear from the results that under either measure of market share the Eurobond underwriting industry is highly concentrated, and that this concentration is increasing. In terms of the dollar volume of issues lead managed, the top 3 Eurobond lead managers have consistently accounted for over 25% of the market during the past 6 years, the top 10 lead managers for an average of

TABLE 1

Market Concentration: Lead Manager Shares of New Eurobond Issues, 1979-1984

	1979	1980	1981	1982	1983	1984
Aggregate Lead Manager Shares of New Eurobond Issues:						
(A) Based on Dollar Volume						
Top 3 lead managers	24%	23%	24%	32%	33%	32%
Top 5 lead managers	32%	31%	35%	41%	41%	44%
Top 10 lead managers	50%	47%	51%	57%	54%	61%
Top 15 lead managers	61%	58%	63%	66%	65%	70%
Top 25 lead managers	76%	72%	75%	78%	78%	83%
(B) Based on Weighted Number of Issues						
Top 3 lead managers	17%	16%	15%	22%	16%	n.a.
Top 5 lead managers	25%	23%	25%	29%	24%	—
Top 10 lead managers	39%	34%	39%	43%	37%	—
Top 15 lead managers	50%	45%	50%	53%	49%	—
Top 25 lead managers	65%	57%	66%	67%	67%	—

	1979	1980	1981	1982	1983	1984
Lead Manager Shares of New Eurobond Issues by Tiers:						
(A) Based on Dollar Volume						
Lead mgr. positions 1-3	24%	23%	24%	33%	33%	32%
Lead mgr. positions 4-5	8%	8%	11%	8%	8%	12%
Lead mgr. positions 6-10	18%	16%	16%	16%	13%	17%
Lead mgr. positions 11-15	11%	11%	12%	9%	11%	9%
Lead mgr. positions 16-25	15%	14%	12%	12%	13%	13%
(B) Based on Weighted Number of Issues						
Lead mgr. positions 1-3	17%	16%	15%	22%	16%	n.a.
Lead mgr. positions 4-5	8%	7%	10%	7%	8%	—
Lead mgr. positions 6-10	14%	11%	14%	14%	13%	—
Lead mgr. positions 11-15	11%	11%	11%	10%	12%	—
Lead mgr. positions 16-25	15%	12%	16%	14%	18%	—

Sources: 1979 through 1983 figures are from the sources cited in part (A) of this section. Data used to compute the 1984 figures are from Euromoney ("The Competition Intensifies as the Eurobond Market Expands," Euromoney, Feb. 1985, p. 117)

53%, and the top 25 lead managers for over 77%.[23] As a percentage of the total lead management positions available, market share results were only slightly lower: from 1979 through 1983, the top 3 lead managers won an average of 17% of all available lead management positions, the top 10 took 38%, and the top 25 accounted for 64%.

In addition to the general level of market share concentration, two other important factors are clear from Table 1:

> (1) The aggregate market share commanded by the top 25 lead managers has remained fairly constant from 1979 to 1983; and,
>
> (2) The tier which has experienced the most significant changes is that of the top 3 lead managers. This uppermost tier of Eurobond market lead managers showed a strong increase in market share in 1982 which has been sustained in 1983 and 1984. As we shall discuss below, this increase in market share was primarily caused by changes in the FRN sector.

The 1982 expansion in market share experienced by the top 3 lead managers occurred for both the dollar volume and the number of issues lead managed. The dollar volume lead managed by the top 3 increased from 24% to 33%, and the number of issues from 15% to 22%. This increased level of market share continued for the top 3 lead managers in 1983 and 1984 in dollar volume terms. Market share results measured in terms of the number of issues lead managed, however, indicate a 1983 return to the market share structure of the 1979-1981 period.

The extended high level of concentration in the top 3 lead managers in 1983 when measured on a dollar volume basis resulted from an increase in the average dollar amount lead managed per issue. As shown in Table 2, this average amount increased from $79 million in 1982 to $88 million in 1983, while the average amount for all other groups in the top 25 declined.

The 1983 dollar volume of new issues lead managed by the top 3 houses is skewed, however, by two mammoth FRN issues of $1 billion and $1.2 billion by the Kingdom of Sweden and an $850 million FRN issue by the government of Malaysia, all of which were brought to the market by Credit Suisse First Boston as sole lead manager. Until recently such large issues have been highly unusual, and sole lead management of such issues even more unusual. However, recent developments in the FRN sector suggest that more sole lead managements of jumbo FRN issues are likely in the next few years. Because of these jumbo issues, the ratio of the proportion of the

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[23] The aggregate market share for the top 10 lead managers found in this study is substantially lower than the 75% share that has been attributed to the top 10 in industry publications. This is due to the elimination of double counting in the market share computation, as noted above.

TABLE 2[24]

Average Dollar Amount Lead Managed Per Issue, 1979-1984

($US in millions)	1979	1980	1981	1982	1983	1st Qtr 1984
Top 3 lead managers	36.4	43.7	54.7	78.8	87.7	73.9
Top 5 lead managers	34.9	36.8	49.5	72.3	69.9	75.4
Top 10 lead managers	33.7	40.3	45.2	73.8	58.1	70.5
Top 15 lead managers	34.6	37.3	42.0	65.1	51.8	60.9
Top 25 lead managers	32.5	36.1	36.0	60.7	45.3	56.4

dollar volume of issues lead managed to the proportion of lead management positions awarded increased greatly for the top 3 lead managers, from 1.4:1 in 1979 to 2.1:1 in 1983. For the remainder of the top 25, the ratio of dollar volume share to the proportion of lead management positions taken has fallen, from 1.1:1 in 1979 to 0.9:1 in 1983. Overall, those lead managers in the bottom tiers of the top 25 must capture an increasing number of mandates to manage the same dollar volume of issues, while those in the uppermost tier (the top 3) have seen the opposite result.

While the continuation into 1983 of the 1982 increase in market share for the top 3 lead managers was the result of increased average amounts lead managed per issue, the original 1982 increase was caused by a very different phenomenon. This is clear from the trend in market share based on the number of issues lead managed. Except for a sharp upward spike in the proportion of the number of lead management positions taken by the top 3 lead managers in 1982, the number of issues measurement reveals a fairly constant market share pattern from 1979 to 1983. In order to understand this result, the changing pattern of market share concentration in 1982 and 1983 must be viewed in the context of the dramatic changes occurring in the size of the Eurobond primary market during this period. In 1982, the volume of new Eurobond issues more than doubled, rising from $24.8 billion to $54.7 billion. It is not surprising that the pattern of market share concentration was altered as well. It is important, however, that the distribution of market share among the top 25 lead managers in 1983 returned to the pattern of 1979-1981—prior to the skyrocketing 1982 increase in new Eurobond issues. This suggests that the 1982 surge in market share accorded to the top 3 lead managers reflected a short term adjustment to the market's increased volume, and not a more fundamental change. The market turned to those lead managers with the strongest placing power to fill the massive new distribution needs created by the sudden surge in new Eurobond issues. This analysis is supported by the fact that the composition of the additional issues lead managed by the top 3 lead managers in 1982 was similar to the composition of the marginal new issues added to the market as a whole. FRN's comprised 18% of all marginal new issues in 1982, and 13% of the marginal new issues managed by the top 3 lead managers. For straight bonds these proportions were 80% and 84%, respectively, and for convertible and warrant issues the same proportions were 2% and 3%, respectively.

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[24] Sources: as for Table 1.

Given the 1983 and 1984 results in Table 1, it is also clear that this new demand has now shifted to the lower tiers of the top 25 lead managers. The individual tier results in the bottom half of the table show that the share of lead management positions captured by the top 3 lead managers declined to 16% in 1983, a return to this tier's 1979-81 market share. At the same time, the top 16-25 lead managers showed an increased market share in 1983, above their former 1979-1981 levels. The remainder of the top 25 lead managers maintained levels similar to their 1979-1981 pattern.

Finally, it is important to note that while the market share pattern in dollar volume terms for the first quarter of 1984 was very similar to the 1979-1981 structure of market share, full year results show a continuing concentration of dollar volume in the uppermost tiers. No jumbo issues with sole lead managers were included in these first quarter results. This further strengthens the conclusion that the 30%-plus market share captured by the top 3 lead managers in the past three years depended primarily upon the presence of very large issues with few lead managers.

2. Competition for Lead Management Business Among the Top 25 Lead Managers, 1979-1984

Examining the stability of market share among the top 25 lead managers reveals that the identities of the top 25 shifted slightly during the 1979-1984 period. The analysis of the continuity of lead manager position was conducted as follows: The top 3, 10, and 25 lead managers were identified for 1983. Based on these 1983 rankings, each lead manager's earliest presence in its 1983 tier was determined. The earliest presence was defined as the first appearance of the lead manager in its 1983 tier during the 1979-1983 period. It was then determined whether the lead manager maintained its position in that tier continuously until 1983. Thus, the first line under part (A) of Table

TABLE 3

Continuity of Membership of the Top Lead Manager Tiers, 1979-1984

	Number of 1983/4 top 25 present for the first time in:					
Top 25 Lead Managers	1979	1980	1981	1982	1983	1984
(A) Based on 1983 Rankings						
Present continuously to 1983	13	2	1	2	2	—
Absent 1-2 years of period	3	0	2	0	0	—
Total	16	2	3	2	2	—
(B) Based on 1984 Rankings						
Present continuously to 1984	11	2	1	0	0	0
Absent 1-2 years of period	2	2	2	1	0	0
Total	13	4	3	1	0	0

	Number of 1983/4 top 10 present for the first time in:					
Top 10 Lead Managers	1979	1980	1981	1982	1983	1984
(A) Based on 1983 Rankings						
Present continuously to 1983	4	1	1	0	0	—
Absent 1-2 years of period	1	1	2	0	0	—
Total	5	2	3	0	0	—
(B) Based on 1984 Rankings						
Present continuously to 1984	4	1	1	0	0	0
Absent 1-2 years of period	2	1	0	0	0	—
Total	6	2	1	0	0	0

	Number of 1983/4 top 3 present for the first time in:					
Top 3 Lead Managers	1979	1980	1981	1982	1983	1984
(A) Based on 1983 Rankings						
Total (All present continuously)	2	0	1	0	0	—
(B) Based on 1984 Rankings						
Total (All present continuously)	2	1	0	0	0	0

3 shows the number of 1983 top-25 lead managers that were present in the top 25 continuously since 1979, followed by the number that first appeared in and were present continuously since 1980, 1981, etc. The second line shows the number of 1983 top-25 lead managers present in 1979 and 1983 but absent for one or two years in between, followed by the number of the 1983 top 25 that first appeared in 1980, 1981, etc. This analysis was performed for three different groups of lead managers—the top 3, top 10, and top 25—and was repeated once using the 1983 rankings as a base and once based on preliminary 1984 rankings.

The results show that thirteen of the top 25 lead managers in 1983 held positions in the top 25 continuously since 1979, and three more were present in 1979 and missed only one or two years between 1979 and 1983. (Two of these missed only one year during the period.) An additional two were present in the top 25 lead managers continuously since 1980. Thus, 17 of the top 25 lead managers in 1983 had held a top-25 position for at least four of the five years observed. Stability among the top 10 lead managers has been similar to that for the top 25: six of the top ten lead managers in 1983 were present in the top ten for at least four of the five years observed. Finally, the uppermost tier of lead managers, the top 3, has been extremely stable. Two of the top three have been present in that tier continuously since 1979. The 1984 results show only slightly less stability.

In exploring market share stability in the Eurobond market, the jostling for position among the top 25 lead managers cannot be overlooked. The top two lead manager positions have remained remarkably stable since 1979, with Credit Suisse First Boston ranking first and Deutsche Bank second in four of the six years. The third place position has been slightly less stable, with Morgan Stanley holding this rank in three of the six years. The remainder of the top 25 show less stability, with 11 positions showing no repetition of lead manager and 8 showing a maximum of two years (non-consecutive) with the same lead manager.

Despite the stability of the aggregate percentage shares controlled by lead managers in the top tier positions in the Eurobond market, there is clearly substantial competition for lead management business among individual lead managers in these tiers. This conclusion is further supported by the results of our analysis of borrower loyalty in part (C) of this section. In addition, the amount of market share concentration and competition varies across the market's instrument sectors. These sectors are examined in the following subsection.

3. Market Share Concentration by Instrument Sector

The concentration of market share among the top 25 lead managers in each major instrument sector is summarized in Table 4.

TABLE 4

Summary of Market Concentration By Instrument Sector, 1979 and 1983

	1979			1983		
	Top 3	Top 10	Top 25	Top 3	Top 10	Top 25
FRN sector	43%	64%	89%	50%	68%	86%
Straight bonds	24%	53%	80%	30%	52%	79%
Convertible & warrant issues	41%	74%	98%	33%	63%	87%

—Market share is measured based on the dollar volume of issues—apportioned 100% to sole lead managers and in equal shares to co-lead managers.

The floating rate note, straight bond and convertible and warrant issues sectors were each examined, with very different results. Results for the FRN sector were divided between the uppermost lead manager tier (the top 3 lead managers) and the remainder of the top 25. The top 3 lead managers in this sector showed increased market share and strong continuity in lead manager identity, while the remainder of the top 25 showed increasing fragmentation and the lowest continuity of all the instrument sectors. Straight bonds showed highly stable market share for the top 25 lead managers in aggregate, with a clear shift toward the top 3 and away from the remainder of the top 25. Continuity in this sector is remarkably strong. Finally, the convertible and warrant issues sector showed a decline in market share for the top 25 lead managers, slight fragmentation, and relatively low continuity of lead manager identity in the top 25 group.

(a) The Floating Rate Note Sector

The market share results for the FRN sector are presented in Table 5. Aggregate market share for the top tier of lead managers declined dramatically between 1979 and 1982, from 43% to 28%, then increased even more dramatically to 50% in 1983. However, this 1983 jump in market share does not indicate a fundamental shift back to the 1979 market share pattern. The distribution of market share between

TABLE 5

FRN Sector Concentration: Lead Manager Shares of New FRN Issues, 1979-1983

	1979	1980	1981	1982	1983
Aggregate Lead Manager Shares of New FRN Issues:					
(A) Based on Dollar Volume					
Top 3 lead managers	43%	28%	28%	28%	50%
Top 5 lead managers	50%	39%	37%	37%	58%
Top 10 lead managers	64%	56%	51%	55%	68%
Top 15 lead managers	75%	67%	62%	67%	76%
Top 25 lead managers	89%	82%	78%	81%	86%
(B) Based on Weighted # of Issues					
Top 3 lead managers	35%	21%	26%	19%	23%
Top 5 lead managers	45%	26%	34%	24%	33%
Top 10 lead managers	58%	43%	44%	40%	44%
Top 15 lead managers	69%	56%	53%	54%	53%
Top 25 lead managers	83%	70%	65%	70%	72%

	1979	1980	1981	1982	1983
Lead Manager Shares of New Eurobond Issues by Tiers:					
(A) Based on Dollar Volume					
Lead mgr. positions 1-3	43%	28%	28%	28%	50%
Lead mgr. positions 4-5	7%	11%	9%	9%	8%
Lead mgr. positions 6-10	14%	17%	14%	18%	10%
Lead mgr. positions 11-15	11%	11%	11%	12%	8%
Lead mgr. positions 16-25	14%	15%	16%	14%	10%
(B) Based on Weighted # of Issues					
Lead mgr. positions 1-3	35%	21%	26%	19%	23%
Lead mgr. positions 4-5	10%	5%	8%	5%	10%
Lead mgr. positions 6-10	13%	17%	10%	16%	11%
Lead mgr. positions 11-15	11%	13%	9%	14%	9%
Lead mgr. positions 16-25	14%	14%	12%	16%	19%
Number of Lead Managers Active in the Sector:	46	56	68	73	64
Number with Sector Share Greater Than 1%:	25	29	30	24	22

the first, second, and third place lead managers in the FRN sector in 1979 was 22%, 11% and 10%, respectively. In 1983, lead managers in the same positions controlled 34%, 11% and 4%. As discussed above, this dramatic shift of FRN business toward the first-place lead manager (Credit Suisse First Boston), and away from other members of the top 25, reflects the appearance of mammoth issues lead managed by one or only a few lead managers in 1983.

While the market share of the top 3 lead managers measured in dollar value terms in 1979 (43%) was close to their market share in terms of the number of issues lead managed (35%), in 1983 these two measures diverged considerably. Market share of the top 3 in dollar value terms was 50% in 1983, while their market share in terms of the number of issues lead managed was only 23%. For the remaining lead managers in the top 25 a change has occurred in the opposite direction, with the relative number of issues lead managed now greater than the relative dollar value lead managed. While the top 3 lead managers captured 50% of the dollar volume of issues with only 23% of the available lead management positions, the remaining lead managers in the top 25 had to capture 49% of all available lead management positions to lead manage only 36% of the dollar value of issues. This pattern is summarized below:

TABLE 6

Ratio of Lead Managers' Dollar Volume Based Market Share to Their Proportion of Lead Management Positions—FRN Sector

	1979			1983		
	% of # issues	% of $ value	$:# Ratio	% of # issues	% of $ value	$:# Ratio
Top 3 lead managers	35%	43%	1.2:1	23%	50%	2.2:1
Remainder of top-25	48%	46%	.96:1	49%	36%	.73:1

Finally, despite the strong increase in market share for the top 3 lead managers, market share for the remainder of the top 25 (in dollar terms) has declined significantly. This sector is increasingly becoming a two-tier market with the top 3 lead managers, and especially the first place lead manager, controlling an increasing proportion of the dollar value of issues, while the remainder of the market becomes increasingly fragmented. The increasing fragmentation in this sector is further demonstrated by the results in the bottom section of Table 5. The number of active lead managers in the FRN sector increased strongly, from 46 in 1979 to 64 in 1983. At the same time, the number controlling a segment share of 1% or more declined.

Continuity of FRN lead managers occupying the top 3, top 10, and top 25 positions is presented in Table 7. Comparing these results to those in Table 3, it is clear that continuity in the FRN sector is lower than in the Eurobond market as a whole. In the market as a whole, 13 of 1983's top 25 lead managers had been present in the top 25 continuously since 1979, 4 of the top 10, and 2 of the top 3. In the FRN sector, only 5 of the top 25 were present continuously from 1979, 1 of the top 10, and 1 of the top 3. Comparing the FRN sector to the other two instrument sectors (below), the results for the top 3 lead managers differ from those for the remainder of the top 25. Excluding the top 3 positions, lead manager continuity in the top tiers of the FRN sector is the lowest of all three instrument sectors.

Number of 1983 Members Present Continuously Since 1979

	Top 25	Top 10	Top 3
FRN sector	5	1	1
Straight bonds	13	4	1
Convertible & warrant issues	6	3	0

(b) The Straight Bond Sector

Market share concentration for the straight bond sector is presented in Table 8. In this sector, aggregate market share for the top 25 lead managers was very stable from 1979 to 1983. Within the top 25, however, there has been a clear shift toward the top 3 and away from the remainder of the top 10 lead managers. On a dollar volume basis, the market share of the top 3 lead managers increased from 24% in 1979 to 30% in 1983, while that of positions 4 through 10 declined from 29% to 22%. The remainder of the top 25—positions 11 through 25—captured 27% of the market in 1979 and in 1983.

As in the FRN sector, the number of mandates needed to capture the same share of the dollar volume of issues has increased for the lower tiers of the top-25. This can be seen by comparing each lead manager group's proportion of the dollar volume lead managed to its proportion of lead management positions awarded (Table 9). For the lead managers in the 4th through 25th positions, this ratio fell from 1.1:1 in 1979 to 0.9:1 in 1983. This trend has been weaker in the straight bond sector than in the FRN sector, where the ratio fell from .96:1 to .73:1. For the top 3 lead managers in the straight bond sector, the ratio has remained fairly constant. These lead managers captured 30% of the dollar value of Eurobond issues with only 21% of the available lead management positions in 1983. This differs from the FRN sector trend of increasing dollar volumes per mandate for the top 3 lead managers.

Fragmentation in the straight bond sector has increased for those lead managers below the top 25. As shown in the last section of Table 8, the number of active straight bond lead managers increased from 79 in 1979 to 94 in 1983, while the number with market share over 1% remained virtually constant.

Finally, the continuity of lead manager membership in the top 3, top 10 and top 25 tiers of the straight bond sector is remarkably strong. This is illustrated in Table 10. Of the top 25 lead managers in 1983, 13 were present in this group continuously since

TABLE 7

Continuity of Membership of the Top Lead Manager Tiers, 1979-1983
Floating Rate Note Sector

Top 25 Lead Managers	1979	Number of 1983 top 25 present for the first time in: 1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	5	2	2	2	5
Absent 1-2 years of period	8*	1	0	0	0
Total	13	3	2	2	5

Top 10 Lead Managers	1979	Number of 1983 top 10 present for the first time in: 1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	1	0	1	2	2
Absent 1-2 years of period	2	1	2	0	0
Total	3	1	3	2	2

Top 3 Lead Managers	1979	Number of 1983 top 3 present for the first time in: 1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	1	0	0	0	1
Absent 1-2 years of period	0	0	1	0	0
Total	1	0	1	0	1

*Number absent 1 year: 6. Number absent 2 years: 2.

TABLE 8

Straight Bond Sector Concentration: Lead Manager Shares of New Issues, 1979-1983

	1979	1980	1981	1982	1983
Aggregate Lead Manager Shares of New Issues:					
(A) Based on Dollar Volume					
Top 3 lead managers	24%	27%	27%	36%	30%
Top 5 lead managers	35%	37%	41%	46%	37%
Top 10 lead managers	53%	57%	59%	63%	52%
Top 15 lead managers	65%	67%	73%	72%	63%
Top 25 lead managers	80%	74%	84%	85%	79%
(B) Based on Weighted # of Issues					
Top 3 lead managers	19%	23%	18%	27%	21%
Top 5 lead managers	27%	31%	31%	35%	29%
Top 10 lead managers	43%	45%	50%	47%	42%
Top 15 lead managers	54%	56%	63%	60%	57%
Top 25 lead managers	70%	63%	74%	77%	75%

	1979	1980	1981	1982	1983
Lead Manager Shares of New Issues by Tiers:					
(A) Based on Dollar Volume					
Lead mgr. positions 1-3	24%	27%	27%	36%	30%
Lead mgr. positions 4-5	11%	10%	14%	10%	7%
Lead mgr. positions 6-10	18%	20%	18%	17%	15%
Lead mgr. positions 11-15	12%	10%	14%	9%	11%
Lead mgr. positions 16-25	15%	7%	11%	13%	16%
(B) Based on Weighted # of Issues					
Lead mgr. positions 1-3	19%	23%	18%	27%	21%
Lead mgr. positions 4-5	8%	8%	13%	8%	8%
Lead mgr. positions 6-10	16%	14%	19%	12%	13%
Lead mgr. positions 11-15	11%	11%	13%	13%	15%
Lead mgr. positions 16-25	16%	7%	11%	17%	18%
Number of Lead Managers Active in the Sector:	79	103	85	86	94
Number with Sector Share Greater Than 1%:	26	24	22	25	25

TABLE 9

Ratio of Lead Managers' Dollar Volume Based Market Share to Their Proportion of Lead Management Positions—Straight Bonds Sector

	1979			1983		
	% of # issues	% of $ value	$:# Ratio	% of # issues	% of $ value	$:# Ratio
Top 3 lead managers	19%	24%	1.3:1	21%	30%	1.4:1
Remainder of top-25	51%	56%	1.1:1	54%	49%	0.9:1

1979, and an additional 5 missed only one year between 1979 and 1983. (Four of these were in the top 25 in 1979 and missed one year between 1979 and 1983, and one entered the group in 1980 and remained continuously.) Thus, 18 of the straight bond sector's top 25 lead managers in 1983 were present in the top 25 for at least four of the five years observed. Of 1983's top 10 lead managers in this sector, 4 were present in the top 10 continuously since 1979 and one more was present for four of the five years observed. All three of the top 3 lead managers in 1983 held top-3 positions for at least four years. Credit Suisse First Boston and Morgan Stanley, the second and third-ranked houses in this sector in 1983, entered the top 3 in 1980. The first place house in the straight bond sector, Deutsche Bank, has been present in the top 3 continuously since 1979.

(c) The Convertible and Warrant Issues Sector

The results for the convertible and warrant issues sector (Table 11) contrast sharply with those of the FRN and straight bonds sectors. Market share has declined greatly for the top 3 lead managers, from 41% to 33% in dollar volume terms and from 29% to 22% in terms of the number of lead management positions captured. The remainder of the top 25 have shown a slight erosion in their share of the dollar volume of issues, from 59% to 54%, and a stronger decline in their share of the number of lead management positions available (from 66% to 57%). Overall, the aggregate share of the top 25 has declined since 1979.

In terms of the share of lead management positions needed to generate the same share of the dollar volume of issues, the results in this sector also differ from the other two. While the FRN and straight bonds sectors showed an erosion in the ratio of the proportion of the dollar volume of issues lead managed to the proportion of lead management positions captured for the lower tiers of the top 25, in the convertible and warrant issues sector this ratio was virtually constant. As shown in Table 12, this ratio increased from 0.86 to 0.95 from 1979 to 1983. For the top 3 lead managers the ratio also was virtually unchanged, rising from 1.4 to 1.5 over the period.

TABLE 10

Continuity of Membership of the Top Lead Manager Tiers, 1979-1983
Straight Bonds Sector

	Number of 1983 top 25 present for the first time in:				
Top 25 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	13	1	1	1	1
Absent 1-2 years of period	6*	1	1	0	0
Total	19	2	2	1	1

	Number of 1983 top 10 present for the first time in:				
Top 10 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	4	1	1	0	2
Absent 1-2 years of period	1	1	0	0	0
Total	5	2	1	0	2

	Number of 1983 top 3 present for the first time in:				
Top 3 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	1	2	0	0	0
Absent 1-2 years of period	0	0	0	0	0
Total	1	2	0	0	0

*Number absent 1 year: 4. Number absent 2 years: 2.

TABLE 11

Convertible and Warrant Issues Sector Concentration:
Lead Manager Shares of New Issues, 1979-1983

	1979	1980	1981	1982	1983
Aggregate Lead Manager Shares of New Issues:					
(A) Based on Dollar Volume					
Top 3 lead managers	41%	23%	42%	29%	33%
Top 5 lead managers	53%	35%	56%	43%	46%
Top 10 lead managers	74%	54%	72%	66%	63%
Top 15 lead managers	87%	66%	80%	78%	74%
Top 25 lead managers	98%	81%	90%	93%	87%
(B) Based on Weighted # of Issues					
Top 3 lead managers	29%	19%	33%	28%	22%
Top 5 lead managers	36%	26%	49%	37%	36%
Top 10 lead managers	59%	45%	64%	57%	53%
Top 15 lead managers	75%	59%	72%	69%	63%
Top 25 lead managers	95%	74%	84%	84%	79%

	1979	1980	1981	1982	1983
Lead Manager Shares of New Issues by Tiers:					
(A) Based on Dollar Volume					
Lead mgr. positions 1-3	41%	23%	42%	29%	33%
Lead mgr. positions 4-5	12%	12%	14%	14%	13%
Lead mgr. positions 6-10	21%	19%	16%	23%	17%
Lead mgr. positions 11-15	13%	12%	8%	12%	11%
Lead mgr. positions 16-25	11%	15%	10%	15%	13%
(B) Based on Weighted # of Issues					
Lead mgr. positions 1-3	29%	19%	33%	28%	22%
Lead mgr. positions 4-5	7%	7%	16%	9%	14%
Lead mgr. positions 6-10	23%	19%	15%	20%	17%
Lead mgr. positions 11-15	16%	14%	8%	12%	10%
Lead mgr. positions 16-25	20%	15%	12%	15%	16%
Number of Lead Managers Active in the Sector:	29	61	49	46	56
Number with Sector Share Greater Than 1%:	19	27	19	24	24

TABLE 12

Ratio of Lead Managers' Dollar Volume Based Market Share
to Their Proportion of Lead Management Positions—
Convertible and Warrant Issues

	1979			1983		
	% of # issues	% of $ value	$:# Ratio	% of # issues	% of $ value	$:# Ratio
Top 3 lead managers	29%	41%	1.4:1	22%	33%	1.5:1
Remainder of top-25	66%	57%	.86:1	57%	54%	.95:1

The continuity of lead manager membership in the top tiers of the convertible and warrant issues sector is presented in Table 13. Continuity for the top 3 lead managers in this sector was the lowest of all three instrument sectors. None of 1983's top three lead managers was present for more than three of the five years observed. Credit Suisse First Boston, ranked number one in 1983, was present in the top 3 in 1979 and 1980 but not in 1981 or 1982. The second place lead manager, Deutsche Bank, appeared in the top 3 in 1982, and Morgan Guaranty, Ltd., ranked third in 1983, was not included in the top 3 in any of the previous years. Continuity in the remainder of the top 25 was low as well. Of the top 25 as a whole, only 6 were present continuously since 1979 and an additional 4 were present for four of the five years. This was weaker than the results of both other instrument sectors (the FRN sector with 5 present continuously from 1979 and an additional 8 present for four of the five years, and the straight bonds sector with 13 present continuously since 1979 and an additional 5 present for four of the five years). Of the top 10, only three were present continuously since 1979, and an additional 2 were present for four of the five years. This result was slightly stronger than that of the FRN sector, where only one of the top 10 was present continuously since 1979 and 2 more were present for four of the five years, and slightly weaker than that of the straight bonds sector, where 4 lead managers were present in the top 10 continuously since 1979 and an additional 1 was present for four of the five years observed.

Finally, the bottom section of Table 11 shows that slight fragmentation is occurring as the number of lead managers active in the convertible and warrant issues sector expands. This expansion in the number of active lead managers coincides with the growth of the convertible and warrant issues sector. This sector began to increase strongly in 1980, and the number of lead managers skyrocketed from

TABLE 13

Continuity of Membership of the Top Lead Manager Tiers, 1979-1984
Convertible and Warrant Issues Sector

		Number of 1983 top 25 present for the first time in:			
Top 25 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	6	3	3	1	4
Absent 1-2 years of period	2	4	0	0	0
Total	10*	7	3	1	4

		Number of 1983 top 10 present for the first time in:			
Top 10 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	3	1	0	1	1
Absent 1-2 years of period	3	1	0	0	0
Total	6	2	0	1	1

		Number of 1983 top 3 present for the first time in:			
Top 3 Lead Managers	1979	1980	1981	1982	1983
(Based on 1983 rankings)					
Present continuously to 1983	0	0	0	1	1
Absent 1-2 years of period	1	0	0	0	0
Total	1	0	0	1	1

*2 lead managers were present in the top 25 in 1979 but then absent until 1983.

29 to 61. There has been some shakeout in this sector since 1980, but the number of active lead managers has almost doubled overall, from 29 in 1979 to 56 in 1983. At the same time, the number of lead managers with a segment share greater than 1% has increased slightly, from 19 in 1979 to 24 in 1983.

C. Borrower Loyalty

With the increased scrutiny of lead manager performance brought on by the development and growth of the gray market, the increasingly favorable market conditions encouraging entry into the Eurobond underwriting industry during the past few years, and the high level of competition among top tier lead managers, it is not surprising that borrower loyalty to traditional lead managers has come increasingly into question in recent years. This section examines lead manager and borrower relationships from 1979 to 1983 in order to determine whether the pattern of these relationships has shifted during the past five years. The results are then analyzed in terms of their implications for borrower loyalty in the Eurobond underwriting industry.

In order to assess the continuity of relationships between lead managers and borrowers, both lead managers and borrowers were grouped by nationality. Each borrower group was then analyzed to determine the composition of its lead manager selections from 1979 through 1983, in terms of lead manager nationality. Similarly, each lead manager group was analyzed to determine the composition of its Eurobond business in terms of the nationality of the borrowers. Using this information, the following questions were examined:

(1) whether the majority of the borrower groups consistently gave their Eurobond issues to the same group of lead managers during the period;

(2) whether the proportion of borrower groups maintaining a consistent primary relationship as described in (1) is increasing or decreasing; and,

(3) whether these trends differ across currency and instrument sectors.

While this does not directly measure each individual borrower's loyalty to individual lead managers, it does provide an indication of loyalty by demonstrating whether the pattern of borrower and lead manager relationships is changing.

The results demonstrate that borrower selection of lead managers has a large basis in historical relationships. However, this basis for selection has declined in importance since 1979. Historical relationship is increasingly dominated by other considerations such as the lead manager's placing power, expertise in particular currency sectors and experience in placing particular types of Eurobond instruments.

1. The Continuing but Declining Importance of Historical Ties in the Selection of Eurobond Lead Managers

The borrower groups used in this analysis include only those active in the Eurobond market in at least four of the five years observed, plus West Germany. Selected on this basis, 22 borrower groups were examined.[25] Together, this set of borrowers represents the following proportions of new Eurobond issues: 91.1% in 1979, 91.2% in 1980, 97.6% in 1981, 96.0% in 1982, and 91.8% in 1983. The average percentage of new Eurobond issues represented is 93.5%. It should be noted that infrequent or small borrowers, not included in this analysis, include many South American, Middle Eastern and Eastern Bloc countries.[26] Several Central American and Asian countries also have been excluded, however for these regions the largest borrowers (Mexico and Japan, respectively) are included in the analysis. Since the excluded borrowers have never formed a significant proportion of the Eurobond market as a whole, their absence does not significantly affect the conclusions of this section. However, those with a particular interest in the above geographic regions should note these exclusions. This constraint does *not* apply to our conclusions regarding borrower loyalty in the various currency and instrument sectors of the market (subsections 2 and 3, below), where all borrowers were included.

Finally, in this analysis the largest borrower groups—those borrowing at least $500 million in 1979—have been separated from the remainder. This was necessary since the same absolute shift in activity causes larger percentage changes in the lead manager selection patterns of small borrower groups than in the selection pattern of large borrower groups. Large borrower groups are therefore more likely to show stability in their selection patterns, making it interesting to compare the results for this category of borrowers with the results for smaller borrower groups.

The consistency of lead manager selection is summarized in Table 14. As shown in the third line of the table, 20 borrower groups representing an average of 87.6% of annual new issues showed a continuing preference for lead managers of a single country. For borrowers representing 67.4% of the market, the preferred lead manager group was predominant over all others in all five of the years observed. Borrowers representing an additional 16% market share awarded a predominant share of their issues to the preferred lead manager group in four of the five years observed.

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[25] These groups included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Great Britain, West Germany, Ireland, Israel, Italy, Japan, Mexico, the Netherlands, New Zealand, Norway, Spain, Switzerland, Sweden, the United States, and supranational organizations.

[26] Those borrowers not included are: Algeria, Argentina, Brazil, Chile, Colombia, Costa Rica, Egypt, Greece, Hong Kong, Hungary, South Korea, Kuwait, Luxembourg, Malaysia, Panama, Peru, the Philippines, Portugal, Siam, Singapore, South Africa, Taiwan, Thailand, Venezuela and Yugoslavia.

TABLE 14

Consistency of Borrower Relationships with Lead Manager Groups

	Total # Included	# With Preference	# With Lead Mgr. Group Predominant: All 5 Yrs.	In 4 Yrs.	In 3 Yrs.
Borrower Category:					
Large	8 (74.5%)*	7 (69.3%)	5 (56.3%)	2 (13.0%)	0 (0.0%)
Small	14 (18.9%)	13 (18.3%)	7 (11.1%)	3 (3.2%)	3 (4.0%)
All	22 (93.4%)	20 (87.6%)	12 (67.4%)	5 (16.2%)	3 (4.0%)

*The percentage figures represent the average proportion of annual new Eurobond issues attributable to the cited borrower groups.

Separating the large and small borrower groups reveals that seven of the eight large borrower groups maintained the same predominant lead manager group for at least four of the five years observed, compared to ten of the fourteen smaller borrowers. For the reasons noted in our discussion at the beginning of this subsection, it is not surprising that the large borrower category shows the highest level of consistency in lead manager selection. It is important, however, that over 70% of the smaller borrower groups showed a similar preference for one lead manager group.

The magnitude of the market share being awarded by borrowers to their predominant lead manager groups also demonstrates the continuing significance of historical relationships. For the borrower groups maintaining a consistently predominant lead manager in at least four of the five years observed, the share of issues awarded to the predominant lead manager group was distributed as shown in Table 15.

Two distributions are presented here: (1) the distribution of average market shares awarded by borrowers to their predominant lead managers from 1979 to 1983; and, (2) the distribution of market share awarded by borrowers to their predominant lead manager groups in 1983. Both indicate the high proportion of issues awarded by borrowers to their traditional lead manager groups. In each case, borrowers representing approximately 70% of the Eurobond market awarded over 25% of their issues to a single, historically predominant lead manager group. Further, the proportion awarded to the traditional lead manager group is over 50% for borrowers representing more than ⅓ of the market. These continuing lead manager group relationships are therefore significant in magnitude as well as in number.

TABLE 15

Proportion of Borrowers' Issues Awarded to Traditional Lead Managers

Proportion Awarded**	# of Borrower Groups and % of Market Share Represented:* Based on Average Proportion Awarded, 1979-83	Based on Proportion Awarded in 1983 Alone
15-25%	3 (14.5%)	1 (10.8%)
25-50%	6 (33.0%)	10 (39.4%)
50-75%	6 (34.3%)	4 (31.5%)
Over 75%	2 (1.8%)	2 (1.8%)

*Percent of Market Share Represented = the average proportion of new Eurobond issues represented by the cited borrower groups, 1979-1983, based on the dollar volume of issues.

**Proportion Awarded = the proportion of the borrower group's Eurobond issues awarded to the traditional lead manager group.

Nevertheless, there is a pattern of decline in these historical relationships. Table 16 presents the trend in market share awarded by large and small borrower groups to their traditional lead manager groups. This table shows that borrower groups representing an average share of 78% of annual new Eurobond issues have reduced the share of issues awarded to their historically prominent lead managers, compared to increases by only four borrower groups representing 15% of the market. A list of the declines in traditional lead manager use by specific borrower groups is presented in Table 17.

TABLE 16

Trends in Predominant Lead Manager Group Shares of Related Borrower Group Issues

	Total # Included	# With Preference	# Awarding Traditional L.M. Group: Decreasing Share	Increasing Share
Borrower Category:				
Large	8 (74.5%)*	7 (69.3%)	5 (57.3%)	2 (12.0%)
Small	14 (18.9%)	13 (18.3%)	11 (20.7%)	2 (3.0%)
All	22 (93.4%)	20 (87.6%)	16 (78.0%)	4 (15.0%)

*Percentage figures represent the average proportion of annual new Eurobond issues attributable to the cited borrower groups.

TABLE 17

Changes in Eurobond Issues Awarded to Traditional Lead Manager Groups

		Share of Borrower Group's Aggregate Issues Awarded to Historically Predominant Lead Manager Group		
Borrower Category	Borrower Group	1979	1983	Decline 1979-83
Large Borrower Groups:	Canada	30.4%	20.0%	10.4%
	France	65.6%	34.8%	30.8%
	Int'l Org.	47.7%	32.9%	14.8%
	Norway	67.7%	27.4%	40.3%
	U.S.	57.6%	52.4%	5.2%
	AVERAGE	—	—	20.3%
Small Borrower Groups:	Australia	59.5%	52.4%	7.1%
	Austria	42.5%	9.2%	33.3%
	Belgium	100.0%	25.8%	74.2%
	Denmark	25.0%	14.6%	10.4%
	Ireland	50.0%	44.4%	5.6%
	Italy	50.0%	9.0%	41.0%
	Mexico	50.0%	18.7%	31.3%
	Netherlands	73.7%	58.3%	15.4%
	New Zealand	50.0%	42.6%	7.4%
	Spain	58.6%	21.5%	37.1%
	Switzerland	100.0%	85.2%	14.8%
	AVERAGE	—	—	25.2%
		1979	1983	Increase 1979-83
Large Borrower Groups:	Japan	36.7%	41.3%	4.6%
	U.K.	26.1%	68.0%	41.9%
Small Borrower Groups:	Finland	45.5%	54.1%	8.6%
	W. Germany	69.2%	71.6%	2.4%

The magnitude of these reductions is also significant: the share of issues awarded to traditional lead manager groups fell by an average of 20% of the borrower's issues for large borrower groups and 25% for small borrower groups. The size of the average decline for large borrower groups is especially interesting since this category would be least likely to show large percentage changes, given the larger base on which the percentage figure is computed. The distribution of the magnitudes of these shifts further emphasizes their importance. The largest proportion of Eurobond market borrowers (in terms of the dollar value of issues), 27.3%, reduced their use of traditional lead manager groups by 10% to 20% of their borrowing between 1979 and 1983. An almost equal proportion, 26.6%, reduced traditional lead manager use by 5% to 10%. Most important, borrowers representing 24% of the Eurobond market reduced their use of traditional lead managers by 30% or more.

The above analysis clearly indicates that, while historical relationships remain important in the selection of Eurobond lead managers, the market shares awarded on the basis of these relationships are declining. The Eurobond market is experiencing increased lead manager competition which is eroding borrower loyalty and has begun to significantly affect market share.

2. *Currency of Denomination and Lead Manager Selection*

While the importance of historical relationships in lead manager choice has declined since 1979, there is an increasing relationship between the currency of denomination of a Eurobond issue and the borrower's choice of lead manager. This is demonstrated in Table 18. The currency sectors surveyed represented at least 95% of the total Eurobond market in each of the five years observed, and an average of 98.4%. The share of each major currency sector awarded to lead managers from the currency's home country has increased by an average of 20% of the sector since 1979 in all except two of the major currency sectors (the French franc and the British pound). The two exceptions to the increasing trend account for an aggregate average of only 5% of all Eurobond issues. Thus, for sectors representing 93% of the market, the relationship between currency of issue and lead manager selection has increased significantly. In addition, in all cases except the Canadian dollar sector, lead managers from the currency's home country handled more than 50% of the issues in that currency. Since the Canadian dollar sector accounted for an average of only 2.4% of all Eurobond issues from 1979 to 1983, this result holds for sectors representing 96% of the Eurobond market.

TABLE 18

Proportion of Major Currency Sectors Awarded to Lead Managers from Currency's Home Country

		Lead Manager Group's Sector Share				
Currency	Lead Manager Country	1979	1980	1981	1982	1983
U.S. Dollar	U.S.	29.9%	34.3%	32.5%	41.9%	31.3%
	C.S.F.B.	15.0%	10.3%	11.9%	16.5%	20.6%
	TOTAL ISSUES*	7822.9	12337.2	20072.6	45375.4	33113.1
Deutschemark	W. Germany	75.8%	78.9%	83.8%	95.4%	93.2%
	TOTAL ISSUES	2597.5	4371.4	1704.2	4235.7	4263.0
British Pound	U.K.	84.6%	36.5%	71.4%	62.2%	55.7%
	TOTAL ISSUES	221.3	1056.6	280.5	802.0	1953.6
Canadian Dollar	Canada	26.3%	38.8%	37.1%	20.1%	43.5%
	TOTAL ISSUES	385.8	264.9	612.7	1299.1	1121.9
Dutch Guilder	Netherlands	74.5%	86.1%	90.8%	98.8%	94.9%
	TOTAL ISSUES	263.5	615.1	506.6	1485.4	1664.7
French Franc	France	91.8%	77.3%	79.7%	—	—
	TOTAL ISSUES	340.8	981.0	631.2	0.0	0.0

Kuwaiti Dinar	Middle East	70.7%	66.4%	44.2%	79.5%	
	TOTAL ISSUES	383.9	26.2	70.8	185.5	0.0
Norwegian Krone	Norway	—	49.8%	100.0%	68.1%	100.0%
	TOTAL ISSUES	0.0	80.1	53.3	32.0	13.7
Yen	Japan	70.2%	72.7%	58.2%	82.2%	88.5%
	TOTAL ISSUES	115.0	254.0	501.2	473.7	276.7
Total Issues ($US in billions) in Above Currency Sectors:		12.1	20.0	24.4	53.9	42.4
Percent of Total New Eurobond Issues:		99.4%	99.4%	98.9%	98.5%	95.7%

*Except as otherwise noted, total issues are reported in millions of U.S. dollars.

In order to determine whether these trends could be driven by historical relationships rather than the currency of denomination of the bonds, for each currency sector the major lead manager groups were tested as follows. The borrowers with historically strong relationships to the sector's major lead manager groups were identified, and their share of the currency sector in question was determined for each of the five years. The trend in these borrower groups' issuing activity in the sector was then compared to the trend in the proportion of sector lead management positions awarded to the traditional lead managers of these borrower groups. If the trend in a lead manager group's share of the sector was driven by historical relationships, then that trend should match the trend in sector issuing activity by related borrower groups.

The results are presented in Table 19. Eight major currency sectors were examined. In all except two, the British pound and the Kuwaiti dinar, the trend in lead manager market share for the currency's major lead managers was opposite the trend in issues by related borrowers.[27] Clearly, the increasing relationship between currency of issue and lead manager choice has not been driven by historical relationships. This conclusion is strengthened by the fact that the two exceptions, the British pound and the Kuwaiti dinar sectors, accounted for an aggregate average of only 3.6% of total Eurobond issues during the 1979-1983 period. Since the entire test group of eight currency sectors comprised an average of 96.3% of the market during this period, the opposite trends were observed in sectors representing 92.7% of all Eurobond issues.

3. Instrument Type and Lead Manager Selection

To determine the importance of historical relationships in the selection of lead managers for various types of instruments, we examined the market's three major instrument sectors: straight bonds, FRN's, and convertible and warrant issues. As in our currency sector analysis, major lead managers in each segment and trends in their market share were identified. These results were then compared to the borrowing patterns of each lead manager group's strongest historical

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[27] Trends were determined by determining the net change in sector activity by the lead manager or borrower group. The net change is computed as follows. For each lead manager group identified in each currency sector, net change = the total increase in the percentage of sector issues lead managed by those lead managers whose activity in the sector is increasing *less* the total decrease in the percentage of sector issues lead managed by those lead managers whose activity in the sector is declining. For all borrower groups with historically strong ties to the lead manager group in question, the following difference is then computed: the total increase in the percentage of sector issues floated by those borrower groups increasing their activity in the sector *less* the total decrease in the percentage of sector issues by those borrower groups whose activity in the sector is declining. This difference is the net change for related borrower groups.

TABLE 19

Comparative Trends in Currency Sector Activity by Major Lead Manager Groups and Related Borrower Groups

	1979-83 Lead Mgr. Group Trend		1979-83 Borr. Group Trends	
Currency Sector	Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector*	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
U.S. Dollar	U.S.	Increasing (1%)	U.S.	Decreasing (11%)
			Canada	Decreasing (3%)
	C.S.F.B.	Increasing (6%)	France	Increasing (3%)
	Net:	INCREASE of 7%	Net:	DECREASE of 11%
Deutsche-mark	W. Germany	Increasing (17%)	Int'l Org.	Increasing (3%)
			Japan	Decreasing (13%)
			W. Germany	Increasing (9%)
			Norway	Decreasing (9%)
	Net:	INCREASE of 17%	Net:	DECREASE of 10%
British Pound	U.K.	Decreasing (29%)	U.K.	Decreasing (36%)
			U.S.	Decreasing (44%)
			Int'l Org.	Increasing (9%)
			Canada	No change (0%)
			Sweden	Increasing (6%)
	Net:	DECREASE of 29%	Net:	DECREASE of 65%

– Continued –

TABLE 19

Comparative Trends in Currency Sector Activity by Major Lead Manager Groups and Related Borrower Groups (Continued)

	1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Currency Sector	Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector*	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
Canadian Dollar	Canada	Increasing (18%)	Canada	Decreasing (39%)
	France	Decreasing (5%)	France	Increasing (4%)
	Switzerland	Decreasing (5%)	U.S.	Increasing (3%)
	U.S.	Decreasing (1%)	U.K.	No change (0%)
			Switzerland	No change (0%)
	Net:	INCREASE of 7%	Net:	DECREASE of 32%
Dutch Guilder	Netherlands	Increasing (20%)	Netherlands	Decreasing (39%)
			Norway	Decreasing (38%)
			Int'l Org.	Increasing (48%)
	Net:	INCREASE of 20%	Net:	DECREASE of 29%
Kuwaiti Dinar	Mid-East	Increasing (9%)	French	Decreasing (3%)
			Mid-East	Increasing (13%)
	Net:	INCREASE of 9%	Net:	INCREASE of 10%

Norwegian Krone	Norway	Increasing (50%)	Norway	Decreasing (100%)
	Net:	INCREASE of 50%	Net:	DECREASE of 100%
Yen	Japan	Increasing (19%)	Japan	No change (0%)
	U.K.	Decreasing (19%)	Int'l Org.	Decreasing (23%)
			Canada	No change (0%)
			Sweden	No change (0%)
			U.K.	No change (0%)
			U.S.	No change (0%)
	Net:	NO CHANGE	Net:	DECREASE of 23%
Average Aggregate Share of All New Eurobond Issues Represented by Above Currency Sectors:			96.3%	

*Trends are reported as the absolute change in subject's share of the currency sector from 1979 to 1983. Hence a 1979 sector share of 10% and a 1983 share of 20% gives an increasing (10%) trend.

borrowers, in order to determine whether the lead manager selection patterns observed were motivated by historical relationships. The results are presented in Tables 20, 21, and 22.

The FRN Sector. Beginning with Table 20, it is clear that lead manager selection in the FRN sector is strongly controlled by factors other than historical relationships. Eleven major lead manager groups were identified, representing an average of 95.5% of the FRN sector (on a dollar volume basis) from 1979 to 1983. Eight of the eleven groups demonstrated opposite trends in lead managers' FRN segment share and related borrowers' FRN issues. These eight represented an average share of 78% of the FRN sector. The major exception was the French lead manager group, which represented an average FRN segment share of 15.6% over the period. As the FRN lead management activity of this lead manager group declined, the net FRN issuing activity of its major borrower groups also declined. However, it should be noted that the decline in the French lead manager group's share of the FRN sector coincides with a strong increase in FRN borrowing by French borrowers. This borrower group exhibits the most powerful historical ties to French lead managers. French borrowers brought 66% of their Eurobond issues to the French lead manager group in 1979, accounting for 46% of French lead manager business that year. Despite the historical strength of their relationship, it is clear that French borrowers have not looked to French lead managers for their increasing FRN needs. The remaining borrowers included in the analysis of French lead manager activity in this sector—Canada, the U.S. and the U.K.—each accounted for less than 11% of French lead manager business in 1979. While this is a significant share, it is far less important than the 46% represented by French borrowers. Thus, while these borrower groups must be included in the numerical results, their impact should be viewed as secondary. The exception represented by the French lead manager group must therefore be discounted. The other exception, Israel, represented only a 1.7% average share of the sector.

One final observation regarding the FRN sector should be noted. In two cases where the lead manager and traditional borrower trends differed, the difference was not significant. However, these two lead manager groups—Italy and Canada—together accounted for an average of only 4% of FRN issues during the period. Absent these two groups, the proportion of Eurobond issues represented by groups showing opposite trends between lead manager groups and related borrowers is 74%. Considering this result and discounting the results for France as discussed above, it is clear that lead manager selection

TABLE 20

Comparative Trends in Floating Rate Note (FRN) Sector Activity By Major Lead Manager Groups and Related Borrower Groups

1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector *	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
U.S.	Increasing (3%)	U.S.	Decreasing (15%)
Net:	INCREASE of 3%	Net:	DECREASE of 15%
C.S.F.B.	Increasing (9%)	U.S.	Decreasing (15%)
		Canada	No change (0%)
		France	Increasing (14%)
Net:	INCREASE of 9%	Net:	DECREASE of 1%
France	Decreasing (11%)	France	Increasing (14%)
		Canada	No change (0%)
		U.S.	Decreasing (15%)
		U.K.	Decreasing (8%)
Net:	DECREASE of 11%	Net:	DECREASE of 9%

– Continued –

TABLE 20

Comparative Trends in Floating Rate Note (FRN) Sector Activity by Major Lead Manager Groups and Related Borrower Groups
(Continued)

1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector *	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
U.K.	Increasing (2%)	U.K.	Decreasing (8%)
		U.S.	Decreasing (15%)
		Int'l Org.	Decreasing (2%)
		Canada	No change (0%)
		Sweden	Increasing (13%)
Net:	INCREASE of 2%	Net:	DECREASE of 12%
Japan	Increasing (3%)	Japan	Decreasing (2%)
		Int'l Org.	Decreasing (2%)
Net:	INCREASE of 3%	Net:	DECREASE of 4%
Israel	Decreasing (3%)	Israel	Decreasing (3%)
Net:	DECREASE of 3%	Net:	DECREASE of 3%

Italy	Decreasing (2%)	Italy	No change (0%)
Net:	DECREASE of 2%	Net:	NO CHANGE
W. Germany	Increasing (3%)	Int'l Org. W. Germany Norway Japan	Decreasing (2%) Increasing (3%) Decreasing (1%) Decreasing (2%)
Net:	INCREASE of 3%	Net:	DECREASE of 2%
Canada	Decreasing (1%)	Canada	Increasing (1%)
Net:	DECREASE of 1%	Net:	INCREASE of 1%
Switzerland	No change (0%)	Switzerland U.S. Canada	No change (0%) Decreasing (15%) Increasing (1%)
Net:	NO CHANGE	Net:	DECREASE of 14%
Middle East	No change (0%)	Middle East France Int'l Org.	Decreasing (2%) Increasing (14%) Decreasing (2%)
Net:	NO CHANGE	Net:	INCREASE of (10%)
Average Aggregate Share of All New FRN Issues Represented by Above Lead Manager Groups:		95.5%	

*Trends are reported as the absolute change in subject's share of the sector from 1979 to 1983. Hence a 1979 FRN share of 10% and a 1983 FRN share of 20% gives an increasing (10%) trend.

was controlled by factors other than historical relationships in the vast majority of FRN issues.

Straight Eurobonds. The straight Eurobond sector showed mixed results. Ten major lead manager groups representing an average annual straight Eurobond sector share of 97% during the 1979-1983 period were included. As shown in Table 21, borrower and related lead manager group trends matched in four of the ten cases observed. These four groups (the French, Swiss, Dutch and Japanese lead managers) represent an average of 22.7% of the straight bond sector. Thus 74% of the straight bond sector showed opposite trends in lead manager market share and related borrower group activity. This result is similar to that found for the FRN sector. However, while the major exception to the declining influence of historical relationships in the FRN sector was extremely weak, the four cases in the straight bond sector for which historical relationships could explain lead manager choice are all strong examples of the continuing impact of traditional relationships. Historical relationships could clearly explain the market share changes for 23% of the straight bond sector, as opposed to only 5.7% of the FRN sector. We therefore conclude that the straight Eurobond sector, while moving away from traditional historical ties in lead manager selection, is still more affected by historical relationships than the FRN sector. For both FRN's and straight bonds, factors other than traditional relationships control lead manager selection in the majority of cases.

Convertible and Warrant Issues. The convertible and warrant issues sector showed opposite results to those of the FRN and straight bonds sectors: in this segment of the market, historical ties could explain lead manager selection for cases representing almost 90% of the issues. As shown in Table 22, seven lead manager groups representing an annual average share of 94% of convertible and warrant issues were examined. Six showed a clear relationship between the lead managers' market share trends and the activities of borrowers with which the lead managers had strong historical ties. These six groups represent an average share of 87% of all convertible and warrant issues.

It is clear from these results that lead manager selection in the FRN sector is least controlled by historical ties between borrowers and lead managers. The straight Eurobond sector seems to be somewhat more controlled by such relationships, and selection of lead managers in the convertible and warrant issues sector has been strongly controlled by historical ties during the past five years. It should be noted that the high degree of relationship importance in the convertible

TABLE 21

Comparative Trends in Straight Eurobond Sector Activity by Major Lead Manager Groups and Related Borrower Groups

1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector*	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
W. Germany	Decreasing (4%)	Int'l Org.	Increasing (11%)
		W. Germany	Increasing (2%)
		Norway	Decreasing (8%)
		Japan	Increasing (6%)
Net:	DECREASE of 4%	Net:	INCREASE of 11%
U.S.	Increasing (3%)	U.S.	Decreasing (4%)
Net:	INCREASE of 3%	Net:	DECREASE of 4%
France	Decreasing (2%)	France	Decreasing (2%)
		Canada	Decreasing (4%)
		U.S.	Decreasing (4%)
		U.K.	No change (0%)
Net:	DECREASE of 2%	Net:	DECREASE of 10%

– Continued –

TABLE 21

Comparative Trends in Straight Eurobond Sector Activity by Major Lead Manager Groups and Related Borrower Groups (Continued)

1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector*	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
U.K.	Decreasing (2%)	U.K.	No change (0%)
		U.S.	Decreasing (4%)
		Int'l Org.	Increasing (11%)
		Canada	Decreasing (4%)
		Sweden	No change (0%)
Net:	DECREASE of 2%	Net:	INCREASE of 3%
C.S.F.B.	Increasing (3%)	U.S.	Decreasing (4%)
		Canada	Decreasing (4%)
		France	Decreasing (2%)
Net:	INCREASE of 3%	Net:	DECREASE of 10%
Switzerland	Decreasing (2%)	Switzerland	Increasing (1%)
		U.S.	Decreasing (4%)
		Canada	Decreasing (4%)
Net:	DECREASE of 2%	Net:	DECREASE of 7%

Canada	No change (0%)	Canada	Decreasing (4%)
Net:	NO CHANGE	Net:	DECREASE of 4%
Netherlands	Increasing (4%)	Netherlands	No change (0%)
		Norway	Decreasing (8%)
		Int'l Org.	Increasing (11%)
Net:	INCREASE of 4%	Net:	INCREASE of 3%
Japan	Increasing (5%)	Japan	Increasing (6%)
		Int'l Org.	Increasing (11%)
Net:	INCREASE of 5%	Net:	INCREASE of 17%
Middle East	Decreasing (5%)	France	Decreasing (2%)
		Int'l Org.	Increasing (11%)
		Middle East	No change (0%)
Net:	DECREASE of 5%	Net·	INCREASE of 9%
Average Aggregate Share of New Straight Bond Issues Represented by Above Lead Manager Groups:		97.3%	

*Trends are reported as the absolute change in subject's share of the sector from 1979 to 1983. Hence a 1979 straight bond share of 10% and a 1983 share of 20% gives an increasing (10%) trend.

TABLE 22

Comparative Trends in Convertible and Warrant Issue Sector Activity
by Major Lead Manager Groups and Related Borrower Groups

1979-83 Lead Mgr. Group Trends		1979-83 Borr. Group Trends	
Major Lead Mgr. Groups	Trend in Lead Mgr. Group's Share of Sector*	Major Related Borr. Groups	Trend in Borrower Group's Share of Sector*
Japan	Decreasing (6%)	Japan	Decreasing (16%)
		Int'l Org.	Increasing (1%)
Net:	DECREASE of 6%	Net:	DECREASE of 15%
W. Germany	Increasing (1%)	Int'l Org.	Increasing (1%)
Net:	INCREASE of 1%	Net:	INCREASE of 1%
U.S.	Increasing (6%)	U.S.	Increasing (11%)
Net:	INCREASE of 6%	Net:	INCREASE of 11%
Switzerland	Decreasing 11%	Switzerland	Decreasing (15%)
		U.S.	Increasing (11%)
		Canada	Increasing (6%)
Net:	DECREASE of 11%	Net:	INCREASE of 2%

C.S.F.B.	Increasing (2%)	U.S.	Increasing (11%)
		Canada	Increasing (6%)
		France	Increasing (4%)
Net:	INCREASE of 2%	Net:	INCREASE of 21%
U.K.	Increasing (2%)	U.K.	Decreasing (1%)
		U.S.	Increasing (11%)
		Int'l Org.	Increasing (1%)
		Canada	Increasing (6%)
		Sweden	Decreasing (3%)
Net:	INCREASE of 2%	Net:	INCREASE of 14%
France	Increasing (1%)	France	Increasing (4%)
		Canada	Increasing (6%)
		U.S.	Increasing (11%)
		U.K.	Decreasing (1%)
Net:	INCREASE of 1%	Net:	INCREASE of 20%
Average Aggregate Share of Convertible and Warrant Issues Represented by Above Lead Manager Groups:		93.8%	

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*Trends are reported as the absolute change in subject's share of the sector from 1979 to 1983. Hence a 1979 convertible and warrant issue share of 10% and a 1983 share of 20% gives an increasing (10%) trend.

and warrant issues sector is probably due to the nationality of the issuers as well as to the nature of convertible and warrant issues. The largest convertible and warrant Eurobond issuers during the period studied were the Japanaese, Americans, and West Germans, which together accounted for an average of 65% of all convertible and warrant issues from 1979 to 1983. For various reasons (including regulatory requirements), all three of these borrower groups show a consistently high use of home country lead managers for their Eurobond issues.

D. Lead Manager Revenue Trends, 1979-1983

Absent artificial controls, as the competitive conditions in an industry are altered the economic rents available to industry participants should change as well. The increasing competition for lead management positions and declining borrower loyalty observed in the Eurobond market from 1979 to 1983 suggest that the revenues available to lead managers should have declined during this period. In fact, a general decline in Eurobond lead management commissions, especially in the FRN sector, has occurred and has been greatly discussed in industry publications. In this section we will systematically explore and document the trends in Eurobond underwriting commissions from 1979 to 1983, with the purpose of comparing trends in various market sectors in the context of our earlier observations regarding competition and borrower loyalty.

1. Information Used in the Analysis

In order to completely assess revenue trends in the Eurobond underwriting industry, we must consider both the contractually stated commissions (prior to reallowances) on the issue and the discounts or reallowances granted.[28] Unfortunately, only the gross commission levels are available on an issue by issue basis. We therefore rely on a specific analysis of the gross commission levels, plus general information regarding reallowances, in assessing the changes in Eurobond lead management revenues from 1979 to 1983.

2. Revenue Trends

Examining the average gross total commissions for various Eurobond maturities clearly demonstrates that some decline in these commissions has occurred since 1979. As shown in Table 23, for the 5- and 7-year maturities total commissions have been reduced by approximately 25 basis points (¼%), and for maturities of 10 years and over the decline has been approximately 40 basis points. This represents an average decline of between 10% and 16% in the general level of gross Eurobond underwriting revenues.

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[28] For the sake of convenience, we shall refer to the stated commissions prior to reallowances as "stated" or "gross" commissions, and to the effective commissions earned after reallowances as "net" or "effective" commissions.

TABLE 23[29]

Eurobond Underwriting Commissions, 1979-1983

	1979	1981	1983
Bond maturity:			
5 years	2.00%	1.75%	1.80%
7 years	2.25%	2.02%	1.96%
Over 10 years	2.50%	2.27%	2.10%

This decrease would be significant even with no change in reallowances. However, reallowances have increased since 1979, further reducing the effective commissions earned on Eurobond issues. This increase has taken two forms. With the increasing relative numbers of institutional investors in the market[30] as well as the proliferation of the gray market since 1979, the relative number of investors sophisticated and/or powerful enough to obtain reallowances has increased. Secondly, the industry has seen an increase in the average size of the reallowances themselves. In 1979, the usual reallowance level was cited as 1%.[31] By 1983, the average level of reallowances was between 1% and 1.5%.[32] Of course, these numbers reflect only formal reallowances and not the full extent of discounting that occurred in 1979 or later. However, this increase in the average reallowance levels represents further evidence of the adjustment of the Eurobond underwriting industry's formal pricing structure to increasing competition.

Average commissions for the major Eurobond instrument sectors are presented in Table 24. It is clear from these results that the overall decline in Eurobond commissions has been driven by changes in the FRN sector. The average total commissions for FRN issues prior to reallowances fell by 50 basis points from 1981 to 1983. However, straight bond gross commissions have remained virtually unchanged and gross commissions for convertible and warrant issues have declined only slightly (8 basis points). In addition, the variations found in FRN gross commission levels from one issue to the next are larger than in the other two sectors, and are increasing. FRN gross commissions showed a standard deviation from the mean of 52 basis points in 1983, up from 45 basis points two years earlier. In comparison, the straight bond sector showed a standard deviation of only 27 basis points in 1983, and in the convertible and warrant issues sector the standard deviation was 24 basis points. Both of these declined from 1981 levels of 35 basis points.

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[29] Sources: 1979 data from Fisher, Frederick G., *The Eurodollar Bond Mrket*, Euromoney Publications, 1979, p. 58. 1981 and 1983 data dervied from Eurobond information gathered in the sources mentioned under "Methodology," above.

[30] See: MacLeod, A., "In Search of the Belgian Dentist," *Euromoney*, June, 1984, pp. 56-62.

[31] Fisher, Frederick G., *The Eurodollar Bond Market*, Euromoney Publications, 1979, p. 84.

[32] Hanna, J. and S. Staley, *International Bond Manual - U.S. Dollar*, Salomon Brothers, Inc., May 1983, pp. 14 and 21.

TABLE 24

Average Total Commissions by Instrument Sector, 1981-1983

	Average Total Commission (and Standard Deviation)*		
	1981	1982	1983
FRN issues:			
All maturities	1.87% (.45%)	1.56% (.52%)	1.37% (.52%)
Up to 5 yrs.	1.67% (.48%)	1.15% (.44%)	0.90% (.63%)
6-10 yrs.	1.90% (.41%)	1.66% (.50%)	1.41% (.48%)
Over 10 yrs.	1.82% (.58%)	1.36% (.49%)	1.38% (.57%)
Straight bonds:			
All maturities	1.93% (.34%)	1.95% (.34%)	1.99% (.27%)
Up to 5 yrs.	1.75% (.33%)	1.87% (.23%)	1.82% (.29%)
6-10 yrs.	2.06% (.27%)	2.00% (.31%)	2.03% (.25%)
Over 10 yrs.	1.90% (.34%)	1.67% (.48%)	2.13% (.16%)
Convertible & warrant issues:			
All maturities	2.38% (.35%)	2.28% (.30%)	2.30% (.24%)
Up to 5 yrs.	n.a. +	1.99% (.32%)	2.08% (.20%)
6-10 yrs.	2.21% (.43%)	2.25% (.23%)	2.20% (.23%)
Over 10 yrs.	2.41% (.33%)	2.48% (.10%)	2.49% (.10%)

*Average total commissions are stated on a gross commission basis (prior to reallowances).

+ Insufficient number of observations.

E. Summary of Changes in the Competitive Structure and in Eurobond Underwriting Commissions Since 1979

The results derived in our analysis of underwriting revenues and competitive trends are summarized in Table 25:

TABLE 25

Market Concentration, Borrower Loyalty and Underwriting Revenues in the Major Instrument Sectors, 1981-1983

	Market Concentration	Continuity of Rankings	Borrower Loyalty	Revenue Trend*
FRN's	Increasing for top 3 lead mgrs, driven by jumbo issues. Strong decline if measured by # of issues only.	Very low	Extremely low	Strong decline Increasing variability
Straight Bonds	Shifting to upper tiers within top 25 lead mgrs. Constant for top 25 in aggregate	Very high	Low	No change Decreasing variability
Convertible & Warrant Issues	Declining	Relatively low	Extremely high	Slight increase Decreasing variability

*Based on gross commissions.

One aspect of these results which must be mentioned is the relationship between the continuity of lead manager membership in the top tiers of an instrument sector and the degree of borrower loyalty found in that sector. In sectors with a high degree of borrower loyalty, lead manager continuity in the top tiers of that sector will be dictated by the activities of those lead managers' traditional borrowers. If the identity of major borrowers in the sector changes frequently, the continuity of lead managers in the sector will be low. Thus, in sectors with a high degree of borrower loyalty, the continuity measurement is not directly tied to the level of competition in the sector. In such sectors, the level of competition can best be assessed by changes in borrower loyalty and market concentration alone. This was the case in the convertible and warrant issues sector.

In sectors with a low degree of borrower loyalty, however, lead manager continuity in the sector's top tiers will bear little relationship to changes in the identity of the sector's most active borrowers. In this case, the continuity measure directly reflects the level of competition in the sector. Where borrower loyalty is low but continuity is very high, as in the straight bond sector, the positions of the sector's major lead managers are firmly established. Where borrower loyalty is low and continuity is low, as in the FRN sector, major players are still in the process of establishing themselves. Competition in this sort of sector is likely to be most aggressive and intense, especially when growth in the size of the sector slows. Whichever case holds, all three measures—borrower loyalty, continuity, and market share concentration—reflect the level of competition in the sector.

It is important to note how closely the revenue trends of part (D), above, coincide with the patterns of market concentration and borrower loyalty observed in parts (B) and (C) of this section. The FRN sector showed a strong increase in the level of market concentration, had the lowest continuity of lead manager position, showed signs of fragmentation and had the lowest level of borrower loyalty of the three instrument sectors. This sector showed the largest erosion of underwriting commissions. The straight bond sector remained largely unchanged in terms of market concentration, showed remarkable continuity of lead manager position, and showed a much higher degree of borrower loyalty. This was reflected in its commission levels, which remained stable over the period. Finally, the convertible and warrant issues sector showed an extremely strong degree of borrower loyalty, but declining market share concentration, slightly increasing fragmentation and relatively low continuity of lead manager positions. Commission levels in this sector declined slightly.

What do these results imply regarding the competitive structure of the Eurobond underwriting industry? This question can only be answered by analyzing these results in the context of underlying industry trends. Section III concludes with such an analysis.

III. Conclusions

Our conclusions regarding the competitive structure of the Eurobond underwriting industry focus on four basic competitive forces identified by Porter as determinants of industry competition:[33]

(1) *rivalry* between the industry's present competitors;

(2) the availability of *product substitutes*;

(3) the relative *bargaining power* of buyers, on one hand, and suppliers on the other, with respect to the industry's producers; and,

(4) the threat of *new entrants* to the industry.

These forces together impact the long run rate of return on investment available to industry producers. As competition in an industry increases this rate of return will gradually decline, with the floor rate equal to the risk free rate of return plus some adjustment for the risk of capital loss faced by industry producers.[34]

It is important to note that all of these forces are affected by the underlying economic, political, and regulatory environments, as well as by changes in Eurobond market technology, the secondary market, and methods of Eurobond distribution. We will therefore include these environmental and technical factors as appropriate throughout our discussion. It is also important to note the distinction between short-term trends that affect competition and profitability in a temporary way, and those which alter the underlying structure and long-term potential of the industry. Finally, the evolutionary nature of competitive forces within an industry must be noted. We will therefore not attempt to describe a static picture of Eurobond underwriting industry structure. Rather, our focus in the remainder of this section will be to examine the changes in the industry's competitive structure to date and to identify the direction of major forces currently influencing this structure.

A. Rivalry Between Competitors

Changes in market share and commission levels of the Eurobond underwriting industry during the 1979-1984 period differed

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[33] Porter, Michael E., *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Macmillan (Free Press), 1980.

[34] *Ibid.*, p. 5.

strongly across the industry's three major instrument sectors (straight bonds, floating rate notes, and equity convertible issues), with the strongest changes occurring in the FRN segment. These changes were largely due to increased rivalry among competitors. The FRN sector showed the strongest increase in underwriter competition, and a strong decline in underwriting commissions. While the stated levels of commissions on issues in the other two instrument sectors remained stable, increased reallowances in the industry as a whole indicate a decline in underwriters' effective commissions in all sectors.

There are many reasons behind the decline in effective commissions for the industry as a whole. Practitioners note a general increase in the intensity of rivalry among competitors which has occurred as the size of the market has increased. In addition to this general result, comparison of the three sectors in terms of four factors—the concentration of market share among the top tier lead managers, the extent of borrower loyalty to traditional lead managers, the continuity of lead manager membership in the sector's top tiers, and the amount of fragmentation in the segment—also indicates that a major force driving these results is a difference in the amount of competitor rivalry in the various instrument sectors.

There are three major determinants of the extent of rivalry between competitors in an industry: (1) the number of active competitors; (2) their relative size and perceived capabilities; and, (3) the growth in demand for their products. Other factors being equal, if there are increasing numbers of competitors with none clearly dominant or if there are several competitors and these competitors are equally matched, then instability will exist in the competitive structure. In the first case there is a strong likelihood of firms believing that they can successfully cut prices without massive retaliation. In the second case there is a strong likelihood of the powerhouses clashing since they have the resources to sustain retaliation. Only when the industry is dominated by one or a few firms and when the relative positions of these firms are clear will rivalry—and prices—tend to stabilize.[35]

Considering these factors in light of the results found in section II, we can begin to draw conclusions regarding the competitive structure of the Eurobond underwriting industry. In the FRN sector, there is a clear distinction between the jumbo-FRN product segment and other FRN's. Market concentration for the FRN sector as a whole is increasing for the top three lead managers, driven by the extremely strong position of Credit Suisse First Boston in the jumbo-issues

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[35] See: Porter, Michael E., *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Macmillan (Free Press), 1980, p. 18.

segment. This position is being threatened, however, by other lead managers with the strong distribution networks needed to handle mammoth issues such as Salomon Brothers and Merrill Lynch, as well as Morgan Guaranty which used its expertise in sovereign FRN issues to cut into C.S.F.B.'s market share in 1984.[36] The rivalry between these top-tier firms is a destablizing force in the competitive structure of the FRN jumbo-issues segment, and the FRN market as a whole. For the remainder of the FRN sector, rivalry is clearly increasing: market share has declined for the top 25 lead managers, fragmentation increased, and continuity of membership in the segment's top tiers is extremely low. The strong decline and increasing variability in FRN commission levels is not surprising in light of these trends in competitor rivalry.

In the straight bond sector, the clear consolidation of market share in the upper lead manager tiers, combined with the extremely high level of continuity for members of these tiers, indicates a more stable competitive environment in terms of the rivalry between competitors. Increases in the number of active lead managers in this sector have not significantly altered the market share of the top 25. While fragmentation is occurring in the lower tiers, the clear dominance of the market share of the uppermost lead managers is not being threatened. Thus, these lead managers continue to act as price setters, and the level of gross commissions has remained relatively stable while the variability in commission levels from issue to issue has declined. Some changes in identity have occurred in 1984, however, most notably the appearance of several new U.S. and Japanese lead managers in the top 25.[37] The only new house in the top five lead managers for this sector was a U.S. investment bank (Salomon Brothers), which also appeared for the first time in the top five lead managers in the FRN sector. Merrill Lynch appeared as one of the top 10 lead managers in the straight bond sector, and Morgan Stanley and Goldman Sachs each moved up in the rankings, to the top 5 and top 10 tiers (respectively). Lehman Brothers moved into 16th place from a ranking of 41st in this sector in 1983. On the Japanese side in the straight bond sector, Nomura Securities moved into the top 10 lead managers while Daiwa Securities, Nikko Securities and Yamaichi Securities moved into the top 15, 20 and 25 (respectively). The Industrial Bank of Japan moved up by one position, to 24th place. These changes occurred primarily due to regulatory changes discussed below as well as a strong U.S. dollar which attracted Japanese investment. The result was a clear increase in rivalry in the straight bond sector in 1984.

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[36] Grant, Charles, "The Liquefaction of the Euromarkets," *Euromoney*, October 1983, p. 141 and Burgess, Roger, "The Competition Intensifies as the Eurobond Market Expands," *Euromoney*, February 1985, pp. 117-128.

[37] Information on 1984 market share is from Burgess, Roger, "The Competition Intensifies as the Eurobond Market Expands," *Euromoney*, February 1985, pp. 117-128.

In the convertible and warrant issues sector, rivalry between lead managers is obscured in the results of section II by the high degree of borrower loyalty to traditional lead manager groups. Although the decline in market share experienced by the top 25 lead managers coupled with the increase in fragmentation in all tiers of this sector suggest that rivalry between competitors is increasing, these changes may be driven by changes in the most active borrowers rather than shifting competition. The slightly increasing commission levels for the longer maturity issues—which comprise the bulk of the convertible and warrant issues sector—also suggest stability in the competitive structure of this segment.

In terms of industry growth, there is generally an inverse relationship between an industry's growth rate and the intensity of competition in the industry. In high growth industries firms can improve their performance simply by maintaining market share. As the rate of industry growth declines, a gain in market share by one firm necessarily means a decline in absolute dollar revenues for others. As a result, rivalry generally becomes more intense as the growth rate falls.

However, this relationship does not seem to hold in the Eurobond underwriting industry. Both the straight bond and FRN sectors have shown strong and increasing growth during the past five years. Growth for convertible and warrant issues has been much less stable, however, and this sector actually decreased in size between 1981 and 1983. Yet rivalry in the strongest growth sectors (FRN's and straight bonds) is increasing while that in the contracting sector (convertible and warrant issues) seems to be stable.

There are several reasons for these results. The first is that the growth trends in the two growth segments have not been strong enough to overcome the effects of changes in the number of producers and their relative market positions. The results of section II indicate that lead manager selection is increasingly determined by product and currency sector expertise. The highly variable interest and exchange rate environments of the past few years have increased the focus on liability management, hedging and new methods to bridge the gaps between markets. This situation, combined with competitive pressures on Euromarket lead managers to distinguish themselves from their peers, has made product innovation increasingly important in determining a lead manager's relative market position. Euromarket instruments and deal structures are evolving at a fiercely competitive rate. In such an environment, rivalry can be expected to increase even with strong growth. As technological change, the proliferation of the gray market and the use of increasing numbers of banks by borrowers make information cheaper and its distribution among borrowers more efficient, the importance of innovation as a competitive strength will continue to increase.

Secondly, the reason may be found in the nature of the Eurobond business itself as described by industry practitioners. These practitioners make a distinction between the ''polite'', ''gentleman's'' rivalry found in the Eurobond underwriting industry ten years ago and the more ''cutthroat'' competition seen today.[38] This change is blamed in part on the increased size of the market. While the market of several years ago had fewer deals and stronger relationships, it has today become a far more impersonal marketplace where competitors are less likely to be well known to one another.[39] Finally, the most powerful reason for the failure of market growth to neutralize the increases in competition in the FRN and straight bond sectors is that other forces, such as regulatory changes and the ensuing threat of product substitution, enhanced the destabilizing effects of shifts in the number and position of segment competitors.

B. Product Substitution

Threats of product substitution rose significantly with the recent repeal of the U.S. withholding tax on interest payments to foreign investors, and the liberalization of key national markets (e.g. the German, French and Japanese markets) presently underway. These changes have a already produced significant shifts in the competitive structure and revenues of the Eurobond underwriting industry, and further changes can be expected in the future.

Before analyzing the impact of product substitution on the competitive structure of the industry, however, it is important to reiterate the boundaries of the industry that we are examining. Our discussion is focused on the Eurobond underwriting business alone, regardless of whether this is the sole business pursued by an industry participant or only one activity of a broadly diversified firm. For the purposes of this study, the Eurobond underwriting industry is defined as encompassing only the Eurobond underwriting and Eurobond underwriting support activities of participant firms. (''Support'' activities include secondary market trading in Eurobonds, the sales function, etc.) Thus, all financial instruments that are not Eurobonds may be potential product substitutes.

We have noted above the effects on competitor rivalry of the market's increasing focus on product innovation. These changes

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[38] Curtin, D., ''Now It's Grown Up, It's Fierce,'' *Euromoney*, June 1984, p. 71.

[39] *Ibid.*

are not unique to the Eurobond market, but have occurred in other markets as well. As a result, the threat of product substitution between the Eurobond market and other markets, as well as substitution of competing products between different segments of the Eurobond market itself, can be expected to raise the degree of competition faced by all Eurobond market participants.

More important to the threat of product substitution is the repeal in 1984 of the 30% U.S. withholding tax on interest paid to foreign investors. Prior to its repeal, U.S. borrowers were able to avoid this tax by issuing Eurobonds through a subsidiary located in the Netherlands Antilles.[40] Since investors will accept lower yields on nontaxable bonds than on taxable issues of similar risk and maturity, the ability to avoid the withholding tax allowed many U.S. borrowers to issue debt in the Eurobond market at a lower cost than they would find available in the U.S. bond market. In fact, since the U.S. government and its agencies followed a policy of not issuing debt through the Netherlands Antilles, U.S. organizations issuing in the Eurobond market did not have to compete with U.S. government entities for Eurobond market funds. As a result, prime U.S. corporate issuers could obtain Eurobond financing at lower yields than those paid by the U.S. government on securities of similar maturity.

The major potential effects of this tax reform on the Eurobond market itself include:

(1) a narrowing, and eventual elimination, of the yield differentials between the U.S. domestic bond market and the Eurodollar bond market; and,

(2) strong attraction of foreign capital out of dollar denominated Eurobonds and into U.S. Treasury issues.

The new threats of product substitution created by these changes point to five major potential changes in the competitive structure of the Eurobond underwriting industry:

(a) In the short and medium term—

(1) major changes in the relative positions of present Eurobond lead managers, increasing rivalry among those remaining and further eroding commissions;

(2) shrinkage in the importance of the Eurobond dollar sector relative to other currency sectors in the Eurobond market (further increasing rivalry among its competitors); and,

(3) further increases in the importance of product innovation as a competitive advantage

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[40] The reason for this was a tax treaty between the U.S. and the Netherlands Antilles making the withholding tax inapplicable for bonds issued there.

(b) In the long term—

(1) as markets become increasingly integrated, increasing concentration of market share in those lead managers with the broadest expertise across markets and strongest worldwide distribution systems; and,

(2) eventually, the emergence of either a "global" market structure (with global lead managers controlling the underwriting business), or a structure with strong competing markets in both New York and London (with more diversity in fee structure and in distribution systems).

The short and medium term implications for Eurobond underwriting revenues point to further erosion of commission levels in all sectors of the Eurobond market. In the long term, revenue stability will be achieved at levels comparable to the "perfect competition" minimum described in part (A) of this section.

Some of these changes are already occurring. The ability to attract Euromarket financing at rates below U.S. Treasuries, once widely available to well rated U.S. corporate issuers, has dwindled to only a few credits.[41] At the same time, foreign purchases of U.S. Treasury bonds and notes increased 75% in 1984, and foreign purchases of U.S. corporate issues climbed 72.%.[42] At least one major U.S. investment bank reports a significant diversion of Japanese investment to U.S. Treasuries that would otherwise have gone into the Eurodollar bond markets.[43] Rather than decrease the Eurobond market's size, however, the period since the repeal has brought unprecedented growth.

There are two major reasons for this phenomenon. First, the tax repeal came at a time of increasing foreign exchange value for the U.S. dollar coupled with a vast U.S. trade deficit, making dollar denominated issues attractive to foreign investors and placing huge amounts of dollars at their disposal. Secondly, borrowing terms remained attractive in the Eurobond market vs. the U.S. domestic market even after the shrinking of the yield differential between these two markets due to further narrowing of the effective commissions earned by Eurobond underwriters.[44] While it is still too early to determine the long term effects of this repeal on Eurobond market size, it is clear that no sign of major retrenchment in the Eurodollar sector is yet visible.

Nevertheless, the potential impact on the competitive

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[41] Winkler, Matthew, "U.S. Change in Rule on Withholding is Reshaping Eurodollar Bond Market," *Wall Street Journal*, May 24, 1985.

[42] Ibid.

[43] Ibid.

[44] See: Hanna, J. and R. Segal, "Removal of U.S. Withholding Tax—Assessing the Market Reaction: Update," Salomon Brothers, Inc., Bond Market Research—International Values series, October 9, 1984.

structure of the industry due to this repeal is great. The impact of the strong U.S. dollar on the Eurodollar sector's size may mask the potential for shrinkage as commission levels fall. Shrinkage has the potential to occur as follows. First, the U.S. withholding tax repeal has been followed by the liberalization of other major capital markets—most notably, France, West Germany and Japan—in order to attract more foreign capital. The result for Eurobond lead manager competition is twofold. In the short run, competition may be expected to increase as the leading institutions in the Eurobond market vie with those historically entrenched in these markets. In the long run, however, the increasing "globalization" of capital markets will result in increasing concentration of market share in those lead managers with the strongest distribution networks. Secondly, the integration of the Eurodollar bond market with the U.S. domestic market can be expected to continue. The increased Eurobond market rivalry already seen in 1984 with the strong entrance of new U.S. and Japanese lead managers in the straight bonds sector and continuing strong competition in the FRN segment can be expected to continue in the short run. In the long term, however, the need to provide borrowers with expertise and placing power in a variety of geographic and product markets will cause weaker Eurobond lead managers to drop out of the market, leaving those most widely active with increased market share concentration.

C. Relative Bargaining Position of Borrowers, Investors and Labor

As a result of recent changes in the relative bargaining power of industry participants, the profits of Eurobond lead managers are subject to increasing pressure from three sides: by borrowers wishing to minimize the commission costs of their Eurobond issues; by investors increasingly able to influence the new issues market (and, in particular, to obtain reallowances from the underwriters); and, by key elements of the labor force, recently in increasing demand, whose salaries have increased accordingly. The first two of these are long-term trends which will have a fundamental effect on the competitive structure of this industry. The shifts in key labor costs, however, may be more transient.

(a) Changes in the Bargaining Power of Eurobond Borrowers

The bargaining power of Eurobond borrowers relative to Eurobond lead managers has increased considerably during the past several years. This increase is the result of three factors:

(1) the strong increase in the amount and accuracy of information available to borrowers regarding lead manager performance, thanks to the proliferation of the gray market and the computerization of gray market trading;

(2) the shift in strategy by most borrowers from maintaining strong relationships with only one "house" bank to establishing relationships with a number of banks in addition to their traditional "house bank" relationships; and,

(3) the increase in the number of lead managers active in the market's major sectors.

The first two of these increase borrower willigness and ability to compare lead managers and choose between them. Not only do borrowers have increased information thanks to the gray market, but by maintaining relationships with a wider spectrum of banks these borrowers receive more information in the normal course of their bank dealings as well. The third factor, the increasing number of active lead managers, contributes to borrowers' opportunities to shift business between various competitors.

(b) Changes in the Bargaining Power of Eurobond Investors

The importance of institutional investors in the Eurobond market is increasing relative to that of the traditional retail investor.[45] This trend has two key effects regarding the balance of bargaining power in the industry. First, simply by the relative sizes of institutional vs. retail investors, underwriters' Eurobond sales will be increasingly concentrated in single investor relationships. In addition to investing larger sums, institutional investors also have a broader range of investment needs than most individual investors, making the average institutional investor's importance to a given underwriting house significantly greater than that of the average individual investor. The ability of such customers to influence the prices quoted to them by underwriters—and, specifically, to obtain reallowances from these underwriters—is greater than that of retail investors.

Secondly, institutional investors are more able to influence the performance of Eurobond issues in secondary trading. Since lead managers generally have a commitment to the borrower to support the issue as well as a commitment to investors to maintain a market for the issue, this ability to influence the performance of Eurobond issues strengthens their position relative to underwriters. This further contributes to underwriter willingness to make concessions to these investors.

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[45] See, for example, MacLeod, A., "In Search of the Belgian Dentist," *Euromoney*, June 1984, pp. 56-62.

(c) Changes in the Bargaining Power of Labor in the Eurobond Underwriting Industry

The huge increase in Eurobond market volume since 1979, the industry's increasing focus on innovation and the increasing importance of the sales function have altered the supply and demand characteristics of the labor market. Demand for managers and sales force personnel have outdistanced the growth in supply of these factors. This is especially true of the labor market for experienced Eurobond managers. One London personnel agency specializing in financial institutions has found that the salary level for new issues managers increased from 37,500 pounds sterling in 1982 to 80,000 pounds sterling by mid-1984.[46] This represents an increase of 113% in 18 months.

The result of this trend, at least in the short term, is clear: while Eurobond commissions are being eroded by increased rivalry and the increased bargaining power of Eurobond borrowers, and while reallowances are becoming more significant due in part to the increasing bargaining power of investors, the labor market has been altered to force an increase in the costs faced by Eurobond underwriters.

D. Barriers to Entry

While entry barriers such as the need for syndication expertise, placing power, and product innovation have always been present in the Eurobond underwriting industry, the importance of these factors relative to other competitive forces was historically fairly small. This is not to say that these barriers were unimportant; the dominance in all sectors of the Eurobond market by underwriters with strong placing power, syndication expertise, and product innovation capabilities will attest to their significance. However, until recently the nature of these barriers has been fairly constant, and the relative impact of barriers to entry on the competitive structure of the industry has been small relative to rivalry and the threat of product substitition, and fairly stable. For example, once the original Eurobond market innovators gave way to large European banks, broad placing power as a competitive advantage was firmly established.

Recent trends have combined, however, to increase the importance of barriers to entry in the market and to introduce new barriers as well. The first of these is the change in distribution techniques from the traditional syndication process to methods requiring far more capital commitment from lead managers. As techniques such as the prepriced deal increase in use, the importance of capital and distribution strength will increase as well. In addition, such techniques have increased the importance of trading expertise in successful Eurobond lead management. The evolution of these distribution techniques will in large part be determined by the reaction of the markets to the U.S. tax reform and subsequent capital market liberalization discussed above. Whatever form these new techniques take in the long run, however, the need for a strong trading function and the ability to commit capital are likely to remain important.

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[46] Schutt, David, "Eurobonds: The Bold New Look in Trading." *Institutional Investor*, May 1984, p. 148.

Secondly, the increased importance of innovative ability for Eurobond underwriting success requires a high level of expertise (i.e., human capital) for lead managers wishing to make inroads into the market. To the extent that the supply of such expertise is short and the price high, this poses another barrier to entry.

The increase in entry barriers, normally a deterrent to competition, has not yet been strong enough to overcome the effects of the other competitive forces described here. In addition, it is unlikely that these barriers will increase sufficiently to seriously limit competition in the short or medium term. However, the continued importance of these barriers in the long term—and the potential long-term industry concentration that they represent—will be large regardless of which form the international debt market ultimately takes.

E. Summary

It is clear from the results above that market share in the largest sectors of the Eurobond market (FRN's and straight bonds) is increasingly concentrated in very few of the uppermost lead managers. Despite this, competition is increasing in the industry due to greater rivalry between the top tier lead managers and increased numbers of lead managers overall. While this trend can be expected to continue in the short term, the major long term question facing Eurobond lead managers is at what point the barriers to entry already existing in the industry will strengthen enough to provoke what erosion of commission levels has so far failed to provoke: a decline in the number of Eurobond lead management competitors and a general consolidation of market share.

To the extent that capital markets are further integrated, this strengthening of entry barriers can be expected to occur sooner. During the next few years we can expect to see increasing integration of the Eurobond market with other capital markets (most notably the U.S. domestic bond market as well as other recently liberalized markets such as Germany, France and Japan). In the short run, these developments coupled with changes in bargaining power among lead managers, borrowers, investors and labor will continue to erode the level of Eurobond market commissions. The identities of top tier lead managers also can be expected to shift in the short run in response to fluctuations in currency sector size. In the long run, changes in Eurobond distribution techniques and the integration of capital markets together will increase lead managers' need for capital, innovative ability and placing power. This will result in stabilization of commission levels as market share is concentrated in a few strongly dominant lead managers, with others unable to provide the three factors needed to compete effectively. The identity of future industry leaders will depend upon these three factors more closely than nationality or borrower loyalty.

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I. Introduction*

This monograph examines the stock exchange specialist system, which is central to trading on U.S. Stock exchanges. The emphasis is on the New York Stock Exchange (NYSE) specialist. On the NYSE, trading is conducted at trading posts manned by specialists who are assigned particular stocks. Specialists do not deal directly with the public, but trade as principals with other brokers or act as brokers' brokers.

Despite rather dramatic changes in the securities markets that include the automation of trading, the institutionalization of savings, and the deregulation of securities markets, the NYSE has maintained its preeminent position among U.S. securities markets. And within the NYSE, the central importance of the specialist system remains unchanged. Although automation in the trading of over-the-counter stocks has produced a major improvement in that market, direct competition to the NYSE made possible in the framework of the intra-market trading system (ITS) and other communications links has not proved very successful. The movement toward a national market system, which was expected by some to divert the order flow away from the NYSE, has slowed perceptibly. In part this is due to regulatory hesitancy; in part it is due to the result of competitive (and lower) NYSE commission rates that eliminate the incentive to trade away from the exchange, thereby strengthening the position of the NYSE; and in part it is due to the way in which trading has been automated to channel the order flow to the NYSE floor as opposed to other trading locations. Aided by the new computer technology, the specialist continues to be the focal point of the order flow.

The monograph is organized as follows. After a brief discussion of alternative market structures and criteria of market efficiency, the alternative roles of stock exchange specialists are described. In Section IV data on the number of specialist units is presented and the composition of New York Stock Exchange volume is analyzed to show that specialists participate in approximately 72 percent of trading volume either in their capacity as dealer or broker. Section V presents data on specialist revenues as broker and dealer and estimates per share revenues in each of those capacities. In Section VI an economic model of the specialist unit, based on previous research, is presented. The degree of specialist portfolio diversification is shown in Section VII to be no greater than it would be if specialists were assigned stocks at random. The special privileges of specialists—their exclusive knowledge of the book of limit orders and their monopoly franchise—are discussed in Section VIII, and regulatory issues are raised. Regulators frequently impose on the specialist some responsibility for ''stabilizing'' prices. His role as a price stabilizer is analyzed in Section IX. One measure of the specialist's efficiency is the size of the bid-ask spread. In Section X some of the evidence on the factors determining the quoted bid-ask spread is presented and the difference between the spreads on the New York Stock Exchange and the NASDAQ system, a competing dealer market, is presented. In Section XI the realized spread, the spread actually earned by the specialist, is defined and shown to be significantly less than the quoted spread, both on the basis of direct evidence from the specialist's revenues and on the basis of indirect evidence. A section ''Summary and Conclusions'' ends the monograph.

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II. Market Structure and Criteria of Efficiency

A. Market Organization

Securities may be traded in a dealer market or in an auction market, in a continuous market or in a call market. In a pure dealer market, investors, represented by their brokers, always trade with a dealer at the dealer's bid or ask price. In a pure auction market, investors, represented by their brokers, trade directly with each other. In a continuous market, trading in securities takes place at all times. In a call market, trading takes place at specific times of the day, when a security is "called" for trading. A continuous market requires the participation of a dealer who is willing to trade immediately, while a call market can operate without dealers.

The New York Stock Exchange (NYSE) is said to be a continuous auction market. A continuous auction market combines features of a dealer market and an auction market. Investors, represented by their brokers, have the opportunity to trade directly with each other in an auction framework to the extent they are present at the same time at the same place, but they can also trade with a dealer—the specialist—who maintains continuity by his willingness to buy at his bid price and sell at his ask price. Furthermore, continuity is also maintained because investors can place limit orders with a broker at prices away from the current market. The inflow of market orders may then also be executed against these limit orders.

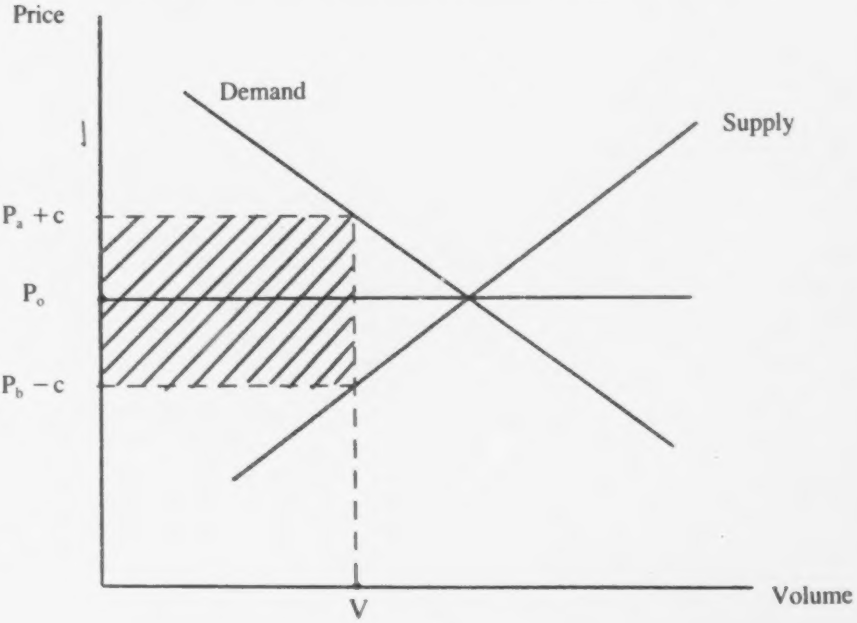
B. Cost of Trading

The cost of securities transactions consists of two components: commissions paid by buyer and seller to brokers on each side of the transaction and the bid-ask spread.

Assume that the "true," underlying price of a security at the beginning of a trading period is P_0, and assume that this price is correct and represents the consensus of opinions at which all investors are willing to hold the existing shares of the security. Assume further, for the purposes of this illustration, that the fundamental price at end of the trading interval, at which the public would continue to hold the shares of the security, remains P_0. In other words, assume that inves-

FIGURE 1:

Demand for and Supply of Shares, and Transaction Costs



tors trade for a variety of reasons, but in the end would agree on a fundamental value that is the same as the value at the beginning. These assumptions imply that the demand to buy shares at P_0 and the supply of shares at P_0 are equal, as shown in Figure 1. In a world without transactions costs, all trades would take place at P_0. However when markets are costly to operate, buyers pay more than P_0 and sellers receive less than P_0. The buyer purchases the security at the market ask price, P_a, and pays a commission, c, and the seller sells at the market bid price P_b, and pays a commission. The amounts, $P_a + c$ and $P_b - c$, are called the net prices to buyers and sellers respectively. In some markets, where dealers and brokers are independent, the transactions prices, P_a or P_b are independent of the commission charge. In other markets, such as the over-the-counter market, where the broker and dealer are sometimes the same firm, the division between the transaction price and the commission (or mark-up and mark-down) can sometimes be somewhat arbitrary. When a transaction is completed without the use of a dealer or when a market operates without dealers, $P_a = P_b$.

In Figure 1, the average trading cost per share is $(P_a - P_b + 2c)$ and total industry revenues are the shaded area in the figure, $(P_a$

$- P_b + 2c)V$. For example, in 1980 total revenues from the provision of broker and dealer services in exchange markets and over-the-counter markets in all equity and option products amounted to approximately $6,847 million. Of this amount approximately $1,834 million was received by exchange specialists, OTC market makers and other market makers.[1] The balance of the revenues is in the form of security commission income (SCI).

C. Criteria of Market Efficiency

The performance of a financial market is judged by its pricing and transactions efficiency. Pricing efficiency is concerned with the price of securities. A financial market is efficient in this sense if prices of securities "fully reflect" all available information and if the information process itself is efficient in the sense that the amount of information collected is optimal. Transactions efficiency is concerned with the pricing of the services of brokers and dealers who facilitate trading. A financial market is efficient in this sense if transactions services are provided at minimum cost—if the shaded rectangle in Figure 1 is as small as possible for a given level of services rendered. Obviously, the presence of transactions costs introduces noise into securities prices that causes transactions prices to deviate from "true" underlying prices.

This monograph examines one component of transactions services—the services rendered by specialists on U.S. securities exchanges. The specialist acts as a dealer for his own account, and in that capacity charges the bid-ask spread. He also acts as a broker's broker with respect to limit orders left with him, and he earns a floor brokerage commission that is part of the public customer's commission. The other principal component of transaction services—the service provided by brokers dealing with the public—was analyzed in an earlier monograph in this series (Stoll, 1979).

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[1] These figures are for firms doing a public business and carrying customer accounts (SEC, *The Securities Industry in 1981*, October 1982, Appendix B-1) and exchange specialist firms (as reported in SEC, "The Financial Experience of Exchange Specialist in 1980," March 16, 1982, Exhibit 1). Exchange specialists had revenues of $357.40 million in 1980.

III. Alternative Roles of Specialists

A. The Specialist as Auctioneer

Before 1870, the New York Stock Exchange operated as a call auction market. A call auction market is a periodic market in which orders to buy and sell are batched over time and trade at a price that is equal to or better than the order price specified on each order. Today, openings on the New York Stock Exchange and the resumpion of trading after trading halt are handled in a manner similar to a call auction market. At the opening, buy and sell orders have accumulated since the last transaction, and the specialist has the responsibility to set a "fair" price which clears all market orders. The specialist may have considerable discretion in setting an opening price depending on the number of orders in his book, on his own willingness to participate, and on his ability to find other traders at the opening. Since about 1982, specialists have been assisted at the opening by the Opening Automated Report Service (OARS), which provides a report of all orders under 5,099 shares received prior to the opening. This service stores all orders that are to receive the opening price and provides the specialist with information on the imbalance between buyers and sellers.

If the specialist views himself primarily as an order clerk, the process of finding the opening price will be a mechanical task of finding the price for which the maximum number of buy and sell orders on hand will be executed. Ho, Schwartz and Whitcomb (1985) analyzed this type of "black box" auction. Since random imbalances in orders can arise for any short trading interval, it is evident that a mechanical calculation of a market clearing price can lead to a random and unjustified divergence of the transaction price from the true price.

Several mechanisms for resolving the difficulties posed by a mechanical clearing exist. First, one can permit additional orders to be placed after announcing a trial clearing price. Or alternatively, one can disclose the orders which exist and permit market participants to place additional orders on the basis of their own judgment of the likely clearing price. Exchange specialists do not generally disclose orders on hand, but they can and do solicit additional orders and may announce trial clearing prices to brokers in "the crowd."

Second, one can allow certain traders, such as the specialist, to take positions for their own accounts so as to narrow any discrepancy between the true price and the trade price that would exist in the absence of such intervention. While such participation by specialists can stabilize prices, it gives specialists a considerable economic advantage. Having observed all the orders, specialists have more information than other traders and can trade at a price that may be profitable. Suppose, for example, a stock closed at $30 and that market buy orders for 20,000 shares and market sell orders for 10,000 shares accumulate overnight. Although this imbalance may simply be random, the specialist may be able to raise the price to, say, 31 while selling 10,000 shares for his own account. A significant difference exists between this activity of filling an imbalance after the fact and the specialists' other function to stand ready as a dealer to meet temporary imbalances at a bid price or an ask price that is established before the direction of the imbalance is known.

B. The Specialist as Broker

With the advent of continuous trading on the NYSE in the 1870's, it became natural for busy floor traders to leave orders with other traders who would specialize in particular securities. These other traders appear to have acted primarily as brokers and received a portion of the customers' commission for that service. Until the post World War II period the most important function of the specialist appears to have been his brokerage function. Only later, as volume increased and as brokers sought speedy execution, did the importance of the specialist as dealer increase.

The specialist as broker executes limit orders left with him by other brokers. Suppose the last transaction in the stock was $36 and suppose the current quote on the stock is 36 bid and 36¼ ask. A limit order to buy 500 shares at 35⅛ would be left with the specialist and recorded on the "book." If the price were to fall so that limit orders to buy at more than 35⅛ were executed, the specialist's quote might fall to 35⅛ bid and 35⅜ ask. The buy limit order on the book becomes the market bid price. Under NYSE rules, public orders have precedence over specialist orders at the same price. Even if the specialist were willing to bid 35⅛, the first transaction at that price would go the limit order on the book.

Limit orders increase the depth and liquidity of markets because buy limit orders below the market keep prices from falling too much and sell limit orders above the market keep prices from rising too much. Second, under NYSE rules, the book of limit orders narrows the market bid-ask spread since the specialist quotes the book if the book's price is superior to his own bid or ask.

C. The Specialist as Dealer

In recent years the role of the specialist as dealer has received the most attention. As dealers, specialists buy and sell for their own accounts as principals. The willingness to quote bid and ask prices prior to seeing the public order flow brings about continuity of markets because public traders can trade at any time with the dealer. While such continuity might be possible by trading against orders placed on the book of limit orders, there is no guarantee that orders on the book at reasonable prices will always be available. The specialist quotes bid and ask prices inside those on the book if he believes he can make profits at these prices. The role of the specialist as dealer is discussed in greater detail in later sections of this monograph.

D. The Specialist as Bystander

The NYSE estimates that institutional investors held nearly 36 percent of the shares listed in 1980, up from 17 percent in 1960.[2] These figures do not include all institutional investors; omitting, in particular, bank administered personal trust funds. Institutional trading volume as a percentage of public volume rose from 31.4 percent in 1960 to 64.9 percent in 1980.[3] Much of the institutional trading is in the form of large block transactions of 10,000 or more shares. Table 1 presents data on the dramatic increase in the number of block transactions. In 1983 over 45 percent of reported volume took the form of block transactions, up from 3.1 percent in 1965.

The specialist system is ill-suited to the trading of large blocks. First, specialists do not have the capital necessary to position large transactions. In 1980 the average capital of specialist units was $6 million, while the average value of block transactions per specialist unit per day was approximately $21 million. Even with considerable borrowing power, specialists clearly have insufficient capital to act as principals in very many block transactions. Second, specialists find it difficult to act as brokers in arranging block transactions between institutional investors because they lack the communications network and contacts necessary to facilitate such transactions. Indeed, under NYSE Rule 113, specialists have been prohibited from taking orders from institutions.[4] As a result, block transactions are arranged by "upstairs market makers" who act as brokers for institutional investors and frequently position large portions of the blocks for their own accounts. Once the parties to the block transaction have agreed upon the price, the block is traded on the New York Stock Exchange Floor at the specialist post. While the specialist, at this point, may trade for his own account or the account of limit orders some of the shares in the block, he is in effect a bystander to the negotiation of the block trade.[5]

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[2] NYSE *Fact Book*, 1984, page 57.

[3] NYSE *Fact Book*, 1984, page 59. Public volume excludes the volume of NYSE members.

TABLE 1

NYSE Large Block Transactions of 10,000 Shares or More

	Transactions			
	Total	Daily Average	Shares (thousands)	% of Reported Volume
1965	2,171	9	48,262	3.1%
1966	3,642	14	85,298	4.5
1967	6,685	27	169,365	6.7
1968	11,254	50	292,681	10.0
1969	15,132	61	402,064	14.1
1970	17,217	68	450,908	15.4
1971	26,941	106	692,536	17.8
1972	31,207	124	766,406	18.5
1973	29,233	116	721,356	17.8
1974	23,200	92	549,387	15.6
1975	34,420	136	778,540	16.6
1976	47,632	188	1,001,254	18.7
1977	54,275	215	1,183,924	22.4
1978	97,509	298	1,646,905	22.9
1979	97,509	385	2,164,726	26.5
1980	133,597	528	3,311,132	29.2
1981	145,564	575	3,771,442	31.8
1982	254,707	1,007	6,742,481	41.0
1983	363,415	1,436	9,842,080	45.6

Source: NYSE, *Fact Book*, 1984.

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[4] This rule might be viewed as the specialists' quit pro quo for Rule 390, which requires that all NYSE member firm transactions as principal be brought to the floor of the New York Stock Exchange. Under Rule 390 specialists see the entire order flow and have an opportunity to participate in the order flow. Rule 390 limits the ability of upstairs market makers to make markets away from the New York Stock Exchange. On the other hand, Rule 113 limits the ability of specialists to interfere in the institutional market making function of upstairs market makers.

[5] The literature on block trading is quite extensive. Early work is contained in SEC, IIS (1971), Chapters 11, 12. See pages 1598-1600 for a discussion of the nature and extent of specialists participation in blocks. Kraus and Stoll (1972) and Dann, Mayers, and Raab (1977) examine the price impact of block trading.

IV. How Central is the Specialist?

Proponents of exchange markets are somewhat ambivalent about the role of the specialist. On the one hand, they point out the central role of the specialist in maintaining an orderly and efficient trading system and in stabilizing prices. On the other hand, they stress the fact that exchange markets are auction markets in which traders can meet without the intervention of the specialist. In this section, data are presented to show that specialists are central to the New York Stock Exchange in the sense that they are involved in a large proportion of trading. The distribution of specialist activities as broker, dealer, auctioneer and bystander are also estimated.

A. Number of Specialists

Table 2 presents data on the number of specialists, the number of specialists units and the number of stocks per specialist unit. According to the Twentieth Century Fund Study, *The Security Markets* (1935) 169 individuals (out of a membership of 1,100) acted ''primarily'' as specialists in 1920. Because the roles of the specialist were not yet clearly defined, these individuals apparently also continued to act as floor traders, and other floor traders assumed the role of a specialist from time to time. By 1933, a year examined in detail in the Twentieth Century Fund Study, the role of the specialist was more clearly defined, and 352 individuals (out of a membership of 1,366) were identified as specialists. That number has increased over time with the decline of independent floor traders. By 1983, 412 members, 35 percent of the total membership, acted as specialists.

Individual specialists are grouped into specialist units. Each unit is usually a single firm (a closely held corporation or a partnership), but some units consists of two or more firms. Table 2 shows that, despite the increase in the number of individual specialists, the number of specialist units has declined over time. As a result, the average number of stocks per specialist unit has increased rather sharply. In 1983 the number of stocks per specialist unit varied from a minimum of six stocks per unit to a maximum of 116 stocks per unit.

Stocks on the New York Stock Exchange are assigned to a particular specialist unit; and, currently, no stock is assigned to more than one unit. However, as late as 1963, some competition existed in

TABLE 2

Characteristics of NYSE Specialists

	1920	1933	1957	1963	1975	1983[3]
Number Specialist Units	NA	230	136	109	67	59
Number of Specialists	169	352	348	360	381	412
Common Stocks Per Unit						
Average		3.5	8.1	11.0	22.9	25.7
Minimum					4	6
Median					19	21
Maximum					93	116
Common Stocks Listed		800[2]	1098	1194	1531	1518
Number of Issues[1]		1300	1522	1572	2111	2307
Number of Issues With Competing Units		466	288	37	0	0

Source: Data for 1920 and 1933 from Twentieth Century Fund, *The Security Markets* (1935) Ch. 12. Data for 1957 and 1963 from U.S. SEC, *Special Study of a Securities Market*. Data for 1975 and 1983 from NYSE publication, *Stocks and Specialists*. Data on listings from NYSE *Fact Book*.

[1] Common stock, preferred stock and warrants.

[2] Listings in 1935

[3] In 1983, the specialist unit, Spear, Leeds & Kellogg Securities, Inc., was responsible for 306 preferred stocks and one common stock. There is also a specialist unit, Spear, Leeds and Kellogg, responsible for 115 common stocks. Finally, Spear, Leeds and Kellogg participates with Corso, Sacken and Co. in a third specialist unit responsible for 24 common stocks. The single common stock of the unit, Spear, Leeds & Kellogg Securities, Inc., is included in the count for the unit, Spear, Leeds and Kellogg, raising the total number of common stocks of that unit to 116, the maximum of any unit The minimum number of common stocks of any unit is then reported as 6, not 1.

37 common stocks, and in 1933 the Twentieth Centrury Fund Study reports competing specialists in 466 stocks. The decline in competition is frequently ascribed to the rise of the dealer specialist and the need to have sufficient capital to execute transactions as principal.[6] However, part of the decline is undoubtedly due to the benefits of centralizing the book of limit orders.

B. Composition of NYSE Volume

While data made public by the NYSE have always been sufficient to determine trading by specialists as principals, trading by other members as principals and trading by the public, limited data released by the SEC for 1975-1980 and data from the 1963 Special

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[6] See, for example, SEC Special Study (1963) Part 2, Chapter VI, page 62.

TABLE 3

NYSE Reported Share Volume:
Total Shares Traded and Estimated Composition of Trading

	1933	1959	1960	1975	1976	1977	1978	1979	1980
Total NYSE Reported Share Volume[1] (Millions)	655	820.3	766.6	4693.4	5360.1	5273.8	7205.1	8155.9	11352.3
Specialist as Broker,[2] % of Total	35.4	29.6	31.0	26.1	25.6	25.0	24.5	24.1	22.2
Specialist as Dealer[3] % of Total	15.7	15.4	15.4	12.6	12.4	11.2	11.8	11.6	12.4
Non-Specialist Member[3] as Principal, % of Total		11.5	11.1	10.9	10.7	12.5	12.7	13.6	14.1
Non-Specialist Member[4] as Broker, % of Total		43.5	42.5	50.4	51.3	51.3	51.0	50.7	51.3
Block Trades[5] % of Total				16.6	18.7	22.4	22.9	26.5	29.2

[1] Reported share volume is "a count of every sale as it was reported to the consolidated tape by the NYSE." (NYSE, 1983 *Fact Book*, p. 9.)

[2] Data for 1976-1978 are from SEC, *The Securities Industry in 1978* (July 26, 1979), Table A-11. Data for 1975, 1979, and 1980 are based on total dollar floor brokerage earned by specialists in assigned stocks as reported in SEC, "The Financial Experience of Exchange Specialists in 1980," (March 16, 1982) and on floor brokerage rates of $.029 per share in 1975 and $.02 per share in 1979 and 1980. The floor brokerage rate of $.029 in 1975 is calculated from the fixed floor brokerage rates then in effect (Stoll, 1979, p. 72), the average stock price of $27 and the 1975 size distribution of transactions (NYSE, *1976 Fact Book*, p. 10). Data for 1959, 1960 are from SEC, *Special Study of the Securities Markets*, Ch. VI, p. 72. Data for 1933 are from Twentieth Century Fund, *The Security Markets*, pp. 414-416. The 1933 data are based on a sample of stocks that may not be representative.

[3] From NYSE, *Fact Book*.

[4] Calculated as a residual from preceding three lines.

[5] From Table 1.

Study of the Securities Markets and the 1935 Twentieth Century Fund Study make it possible to determine the proportion of total trading done by specialists as brokers. These data are important because they present a clearer picture of the total role of specialists in the trading process. Second, specialists trading as brokers measures the extent to which public market orders trade with bids and offers on the book of limit orders as opposed to the bids and offers of the specialist. The data are in Table 3.

Line 2 of the table shows that the participation rate of specialists acting as brokers declined from about 30 percent of total volume in 1959 and 1960 to about 22 percent in 1980. In 1979 the specialist participated as broker in about 24 percent of reported volume. This means that the specialist, representing limit orders on the book, participated in 24 percent of all sales and in 24 percent of all purchases.[7] On the assumption that the specialist would not act as a broker on both sides of a transaction, these figures mean that the specialist participates as broker in about 48 percent of all shares traded.

Line 3 shows that, in recent years, the specialist participates as dealer in about 12 percent of all shares traded (down slightly from over 15 percent in 1959, 1960, 1933). On the assumption that the specialist does not act as dealer on both sides of a transaction, these figures mean that he is buyer in about 12 percent of all purchases and seller in about 12 percent of all sales; that is he acts as dealer on one side or the other in 24 percent of the shares traded.

On the assumption that the specialist never acts as dealer on one side of a transaction and broker on another side of the same transaction, these figures imply that the specialist participates on one side or the other in about 72 percent of all shares traded. The assumption that the specialist never participates on both sides of a transaction either as broker or dealer is probably not totally accurate. For example, when large orders are crossed on the floor at a single price, it is possible for the specialist to be involved as dealer on one side and as broker for the book of limit orders on the other side. According to the Twentieth Century Fund data for 1933, specialists did participate on both sides of certain transactions since the sum of the participation rate as broker and as dealer is in excess of 50 percent.

A simplified picture of the composition of 100 shares of volume based on the data for 1979 in Table 3 is presented in Table 4. Purchases are assumed to equal sales for all categories of market participants: the specialist as broker or dealer, non-specialist member

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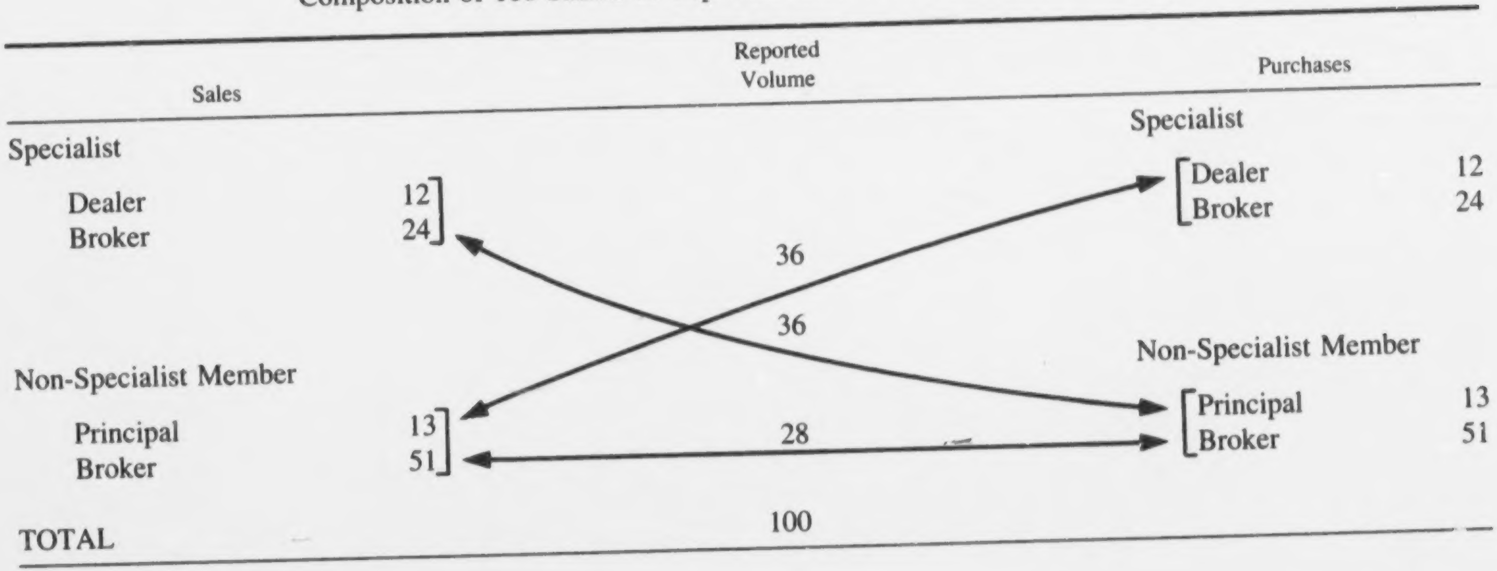
[7] The specialist participation rate is calculated by summing his purchases and sales and dividing by the sum of total purchases and total sales on the exchange. On the assumption that the specialist is not a net buyer or seller, he must participate equally on the purchase and sale side.

TABLE 4

Composition of 100 Shares of Reported Share Volume on NYSE in 1979



Sales		Reported Volume	Purchases	
Specialist			Specialist	
Dealer	12		Dealer	12
Broker	24	36	Broker	24
		36		
Non-Specialist Member			Non-Specialist Member	
Principal	13	28	Principal	13
Broker	51		Broker	51
TOTAL		100		

firms as principal, and non-specialist member firms as brokers on behalf of public orders. The specialist is assumed to participate on only one side of a transaction. The lines in Table 4 connect parties that trade with each other, and the reported volume is shown above the line. On the sale side, 51 shares are sold by the public through member firms acting as brokers and 13 shares are sold by member firms as principals. Of these 64 shares, 36 are bought by the specialist as broker or dealer and 28 are bought by another member firm acting as broker or principal. The 64 shares purchased by non-specialist members are sold by the specialist (36 shares) and by other member firms (28). The total volume is 100: 28 shares not involving a specialist and 72 shares involving specialists on one side.

Now consider the composition of the 28 shares not involving the specialist in order to estimate the extent to which the specialist is a bystander and the extent to which he acts as an auctioneer to facilitate trading by others. In 1979, block trading constituted 26 of every 100 shares of reported volume (Table 1). While nearly all block trades are pre-arranged in "upstairs" markets, some portion of a block is usually traded by the specialist because the block clears limit orders on the book at prices between the last transaction price and the block price and because the specialist frequently positions part of the block. Evidence in the SEC's Institutional Investor Study indicates that specialists' participation rate in blocks (as brokers and dealers) is about 10 percent.[8] A greater participation rate of 18 percent, which is one-half the specialists' average participation rate in 1979 is assumed here. That implies that (1-.18)26 = 21 block shares are traded without specialist participation, leaving 5 block shares in which the specialist participates on one side as broker or dealer.

Thus, of the 28 shares not involving the specialist, 21 shares are pre-arranged block trades in which he is a bystander. The residual of seven shares not involving the specialist represents auction market transactions arranged and carried out on the floor without participation of the specialist either as broker or dealer. Most of this auction volume probably occurs at the opening or after a trading suspension. The composition of reported volume in terms of specialist participation can thus be summarized as follows:

Specialist as Dealer	24%
Specialist as Broker (limit orders)	48%
Specialist as Auctioneer (opening)	7%
Specialist as Bystander (blocks)	21%

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[8] SEC, *IIS* (1971) Vol. 4, Chapter XII, part G.

These estimates of the composition of NYSE volume make clear how central the specialist is to the trading on the floor of the NYSE. The specialist participates on one side either as broker or dealer in 72 percent of all shares traded and in about 91 percent of the share volume that excludes blocks prearranged by "upstairs" market-makers without specialist participation. The volume of limit orders handled by the specialist is surprising. Nearly 50 percent of reported volume involves limit orders on the buy or sell side of each transaction. Limit orders would thus appear to play an important role in narrowing the bid-ask spread and in maintaining continuity and depth of the NYSE market. Only about seven percent of all share volume is carried out in a pure auction framework, arranged and executed on the floor without participation of the specialist. About 21 percent of volume is prearranged in upstairs offices and executed without specialist participation.

One would expect the nature and extent of specialist participation as broker and dealer to vary by individual stock and by individual specialist. Investors in less active stocks tend to place limit orders rather than market orders. Whereas investors in active stocks are more likely to place market orders. The *Special Study of the Securities Markets* examined the size of the book of limit orders for a sample of 79 stocks for February 16, 1962. In the highest volume quintile, limit orders within ± 10 percent of the prior day's closing price amounted to 2.1 times the daily volume. On the other hand, in the lowest volume quintile, limit orders on the book within ± 10 percent of the previous day's closing price amounted to 21.5 times the daily volume.[9] The historical decline in the participation of the specialist as broker may also reflect the increased volume in all stocks and a corresponding decline in the use of limit orders.

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[9] SEC, *Special Study of Securities Markets* (1963), Chapter 6, page 375.

V. Specialist Revenues as Broker and Dealer

Because specialist firms are closely held and do not, in most cases, carry customer accounts, information on revenues and expenses of specialists is not routinely available. The SEC, however, gathered data in its Quarterly Survey of Specialists, which was discontinued in 1981, and released summary data for the period 1975 to 1980.[10] The SEC's *Special Study of Securities Markets* also carried out a survey of specialists and provided data for the years 1959 to 1960. The data not only presented a picture of total revenues of specialists as a group, but also the division between brokerage and dealer revenues. The data are in Table 5.

In the years 1975 to 1980, total floor brokerage in assigned stocks ranges from a low of $58.99 million to a high of $100.91 million, up considerably from about $19 million in 1959-60. On the basis of reported volume figures and the specialist participation rate as broker, which were available for 1976 to 1978 (see Table 3), the per share floor brokerage fee was calculated to be 2.5 cents per share in 1976, 2.2 cents per share in 1977 and 2.1 cents per share in 1978, down considerably from the average floor brokerage rate of $.0385 reported in the Special Study. The floor brokerage fee of three cents per share in 1975 is based on the fixed floor brokerage rates existing at that time and assumptions about the average stock price and average transaction size.[11] The observed decline in per share floor brokerage charges reflects the abolition of fixed minimum floor brokerage rates on May 1, 1976.

In the years 1975 to 1980 trading gains in assigned stocks, derived from buying at the bid price and selling at the ask price, range from a low of $39.66 million in 1977 to a high of $97.29 million in 1979, up considerably from 1959-60. Of course, these are total figures that mask substantial variability across specialist units and substantial month-to-month variability in revenues for any particular specialist unit. The Institutional Investor Study contains evidence on the extent of this variability.[12] On a per share basis, trading gains ranged from 3.2 cents per share to 6.1 cents per share. Over the period examined in Table 5, specialist revenues as broker and dealer are

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[10] SEC, "The Financial Experience of Exchange Specialists in 1980," News release, March 16, 1982.

[11] Stoll (1979), Table 17.

[12] See SEC, *IIS* (1971) Vol. 4, Chapter XII, part G.

TABLE 5

Revenues of NYSE Specialists in Assigned Stocks[1]
1959-1960, 1975-1980

	1959	1960	1975	1976	1977	1978	1979	1980
Floor brokerage in assigned stocks								
Total ($Million)	19.59	18.92	70.99	69.53	58.99	72.99	78.58	100.91
Per share traded[2]	$.0385	$.0385	$.029	$.025	$.022	$.021	$.020	$.020
Trading gains in assigned stocks								
Total ($Millions)	21.24	15.77	71.90	75.01	39.66	54.79	97.20	95.08
Per share traded[3]	$.084	$.067	$.061	$.056	$.034	$.032	$.051	$.034
Investment account gains in assigned stocks								
Total ($Million)			9.01	13.56	3.66	7.93	9.42	7.56
Per share traded[4]			$.008	$.010	$.003	$.005	$.005	$.003
Total revenues ($Million)			161.9	173.7	120.8	171.3	246.6	275.99
Total expenses ($Million)			96.4	105.4	98.10	114.0	142.8	164.89
Capital ($Million)			224.2	263.3	237.6	253.5	318.1	364.30
Return on Capital (percent)			29.2	25.9	9.6	22.6	32.6	30.5

See next page for notes.

approximately equal. Because volume as a broker is about twice that as a dealer, per share brokerge revenues are about ½ per share dealer revenues.

Investment account gains in assigned stocks represent realized or unrealized gains in assigned stocks held in an investment account. Gains and losses in an investment account are treated as investment income, not ordinary income, and may receive capital gains tax treatment.

To provide some perspective, total specialist revenues and expenses are also shown in Table 5 for 1975 to 1980. Specialist revenues as broker and dealer in assigned stock as a percentage of total revenues declined from 88% in 1975 to 71% in 1980. Total expenses include interest, salaries including salaries of individual specialists, rent, etc. Capital represents the quarterly average of specialists' assets minus specialists' liabilities. The before tax return on capital varied between 9.6% and 32.6% in the period 1975-1980.

Notes to Table 5

[1] Data for 1975–1980 are taken from SEC, "The Financial Experience of Exchange Specialists in 1980," Exh I, Exh II and Exh IV. SEC data are collected in its "Quarterly Survey of Specialists," discontinued as of 1981. Data for 1959-1960 are from SEC, *Special Study* . . . Ch. VI, pp. 68-72.

[2] For 1976-1978, calculated by dividing total floor brokerage by number of shares traded in which specialist acted as broker. The number of shares traded as broker is calculated from data in Table 3 as twice reported share volume times specialist participation rate as a broker. For 1975, floor brokerage of 2.9 cents per share is calculated from the fixed floor brokerage rates then in effect (Stoll, 1979, p. 72) and is based on an average stock price of $27 and the size distribution of orders in 1975 (NYSE, *1976 Fact Book*, p. 10). For 1979-80, .02 is assumed. For 1959-1960, the average floor brokerage rate reported in SEC, *Special Study* . . ., Ch. VI, p.72.

[3] Calculated by dividing total trading gains by number of shares traded in which specialists participated as a dealer. Shares traded as a dealer is calculated from Table 3 as twice reported share volume times the specialist participation rate as a dealer.

[4] Calculated by dividing total by number of shares traded as dealer on grounds that investment account gains in assigned stocks arise out of dealership activity.

VI. Economics of the Specialist Unit

Specialists incur a variety of costs in generating the revenues reported in the preceding section. First, both as brokers and dealers they incur order processing costs—the cost of executing and clearing transactions. Second, in their capacity as dealers, they bear the risk of holding inventory. Third, also in their capacity as dealer, they face the cost of trading with investors that have superior information. Finally, some of their revenues derive from their monopoly position on the floor. In this section a model of the specialist that incorporates these elements is summarized.[13]

A. Order Processing Costs

The clerical costs of processing orders can be placed into three categories:

(1) Costs that are fixed over a particular planning horizon, denoted by F_0. These include the cost of space, the cost of computers and other equipment, most labor costs, and the cost of the specialist's time.

(2) Costs that are fixed for any transaction but may vary with the number of transactions, denoted as G(T), where T is the number of transactions during the time period in question. These costs include per trade computer terminal charges and clearing fees as well as variable labor charges associated with increases in the rate of transactions. One would expect G(T)/T, the average variable cost per transaction to exhibit the usual U shape—economies of scale over certain output levels and diseconomies of scale as problems of coordination and back-office snarls increase average costs. As Tinic (1972) notes, these economies of scale are not necessarily specific to a particular stock but may be achieved by adjusting the number of stocks in which a market is made.

(3) Costs that vary with transaction size, denoted as $C(Q_i)$, where Q_i is the dollar transaction size of the ith transaction in the time period under question. Larger transactions impose greater clearing charges and require more attention from the specialist. How-

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[13] The model is based on Stoll (1978a) and Ho and Stoll (1981). The literature on models of market-making is now quite extensive and includes Amihud and Mendelson (1980), Bradfield (1979), Garman (1976), Mildenstein and Schleef (1983). See also Cohen, Maier, Schwartz and Whitcomb (1979) for a survey.

ever, evidence indicates that total order processing costs of a transaction do not increase in proportion to the transaction size and that a large portion of processing costs is contained in G(T).[14]

Total order processing cost per unit of time are given as

$$TC = F_o + G(T) + \sum_{i=1}^{T} C(Q_i) \qquad (1)$$

The last term in (1) is the sum of costs that depend on transaction size. Total cost during a time interval will therefore depend upon the size distribution of transactions as well as on the number of transactions. Given a long enough time period, a specialist unit can trade off among these costs. In recent years technological change and the substantial increases in the volume of trading have warranted the purchase of capital equipment—an increase in F_o—in order to achieve reductions in the variable costs of carrying out a transaction, G(T) and $C(Q_i)$.

The average per dollar cost of carrying out marginal transactions is, on the basis of (1), given as

$$g'(T) + c(Q) \qquad (2)$$

where

$g'(T) = \frac{\partial G(T)}{\partial T} \cdot \frac{1}{Q}$, the marginal cost of the Tth transaction divided by the transaction size, which declines with Q.

$c(Q) = \frac{\partial \sum_{i=1}^{T} C(Q_i)}{\partial T} \cdot \frac{1}{Q} = \frac{C(Q)}{Q}$, the average variable size-related cost of the marginal transaction. This cost is also likely to decline over inital range of Q. Only for large block transactions which pose special problems would one expect c(Q) to rise as a function of Q.

On the basis of empirical evidence on order processing costs, (2) would plot as shown in Figure 2. The level of the curve in Figure 2 depends on T. In very active periods when the specialist's resources are strained, the curve will be displaced upward. In inactive periods when resources are plentiful the curve will be lower.

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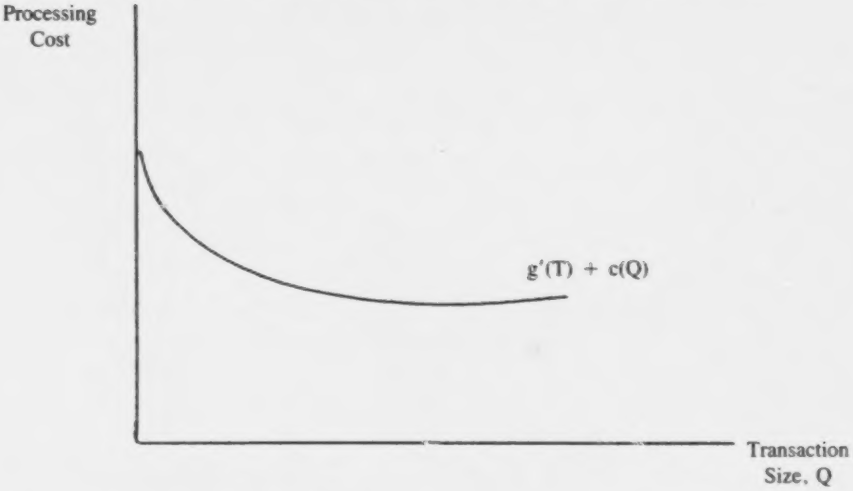
[14] Most of the evidence pertains to brokerage commissions charged public customers. See for example, National Economic Research Associates (July 1970), Stoll (1979). West and Tinic (1971) survey a considerable amount of the evidence.

FIGURE 2:

Average Cost of Processing a Transaction of Size Q



B. Inventory Holding Costs

The specialist as dealer supplies immediacy in the sense of Demsetz (1968) by a willingness to buy at the bid price or sell at the ask price. The specialist thereby takes on inventory that unbalances his own portfolio and imposes on him additional risk he would rather avoid. Stoll (1978) and Ho and Stoll (1981, 1983) show that the per dollar cost to the dealer of bearing the risk associated with a transaction of size Q is

$\frac{1}{2}\sigma^2 A(Q + 2I)$ for a dealer purchase, and (3a)
$\frac{1}{2}\sigma^2 A(Q - 2I)$ ror a dealer sale (3b)

where σ^2 = Variance of the return of the stock. The variance rather than the systematic risk of the stock is relevant because the dealer is not diversified with respect to the marginal transaction.

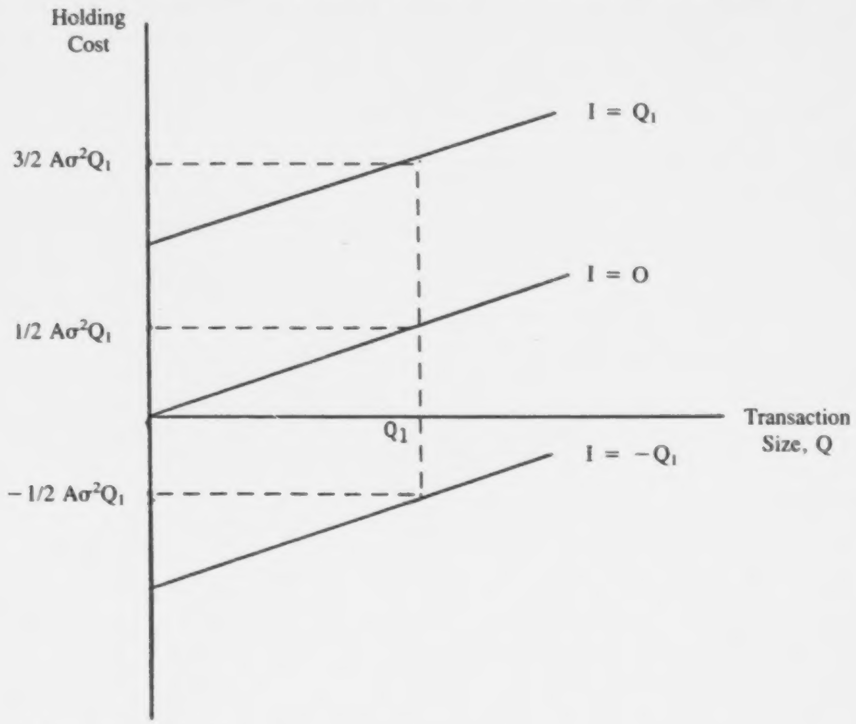
A = Coefficient of absolute risk aversion, which is larger the more risk averse the specialist and the smaller his wealth.

I = Inventory of the stock measured in equivalent units of the stock. The holding cost of a transaction depends on whether the transaction moves the dealer closer to or farther away from his desired inventory position. On the assumption that the specialist has other wealth that is optimally diversified, the desired inventory of assigned stocks is I = 0. A dealer at his desired inventory position will quote a bid price slightly below what he believes to be the true price and will quote an ask price slightly above what he believes to be the true price. On the other hand, a dealer with a short position ($I<0$), will be willing to pay extra to purchase stock in order to return to his desired inventory position. As a result, he might quote a bid price above his estimate of the true price. When a specialist has n other stocks, the inventory position is calculated as $I = \sum_{j=1}^{n} \beta_j I_j$, where $\beta_j = \text{cov}(R_j, R)/\sigma^2$, the coefficient of a regression of the return of stock j on the return of the stock in question.[15]

Figure 3 depicts the holding cost function for a specialist purchase of size Q, given alternative initial inventory positions. (A corresponding diagram can be drawn for a specialist sale.) For given Q and I, costs are higher the riskier the stock and the more risk averse the specialist. When initial inventory is zero, the specialist charges a fee of at least $\frac{1}{2}\sigma^2 AQ$. This is done by setting a bid price below the specialist's opinion of the true price by the amount of the fee. (He would also charge $\frac{1}{2}\sigma^2 AQ$ for a sale.) When inventory is $-Q_1$, the fee

FIGURE 3:

Inventory Holding Cost for Alternative Initial Inventory Positions



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[15] See Ho and Stoll (1983).

is negative, that is the specialist is willing to pay $\frac{1}{2}\sigma^2AQ_1$ to eliminate a short position which implies a bid price above the specialist's opinion of the true price. On the other hand, a positive initial inventory of Q_1 implies a fee of $3/2\sigma^2AQ_1$ and a relatively low bid price.

The bid-ask spread covering holding costs for a transaction of size Q is the sum of (3a) and (3b), that is

$$\text{spread} = \sigma^2AQ \tag{4}$$

which is independent of I. Changes in inventory, as illustrated in Figure 3, must therefore alter bid and ask prices by the same amount. In other words both bid and ask prices fall after a specialist purchase and both increase after a specialist sale.

C. Adverse Information Costs

A number of writers have stressed the fact that the specialist must lose to traders with superior information.[16] Because the specialist quotes bid and ask prices at which he is willing to trade, traders with superior information that justifies a different price can expect to make profits at the specialist's expense. To break even the specialist must charge a fee—lower his buying price and raise his selling price—by the expected value of that information. Since evidence suggests that this information is correlated with transaction size, the per dollar cost of adverse information is a function of Q:

$$k(Q). \tag{5}$$

To the extent that the specialist limits the transactions size for which his quote is good, adverse information cost would also be limited.

D. Pricing

The specialist pricing of his dealer services is illustrated in Figure 4 on the assumption of zero initial inventory and a downward sloping demand curve. The bid price for a transaction of size Q_1, P_b^1, is set below the specialist's opinion of the "true" price, P_o, by an amount sufficient to cover inventory holding costs, adverse information costs, order processing costs and to realize a monopoly profit. The monopoly profit depends on the degree of competition from other traders and other markets and on the level of regulatory oversight. A corresponding figures can be drawn to illustrate that the ask price, P_a, would be set above the "true" price.

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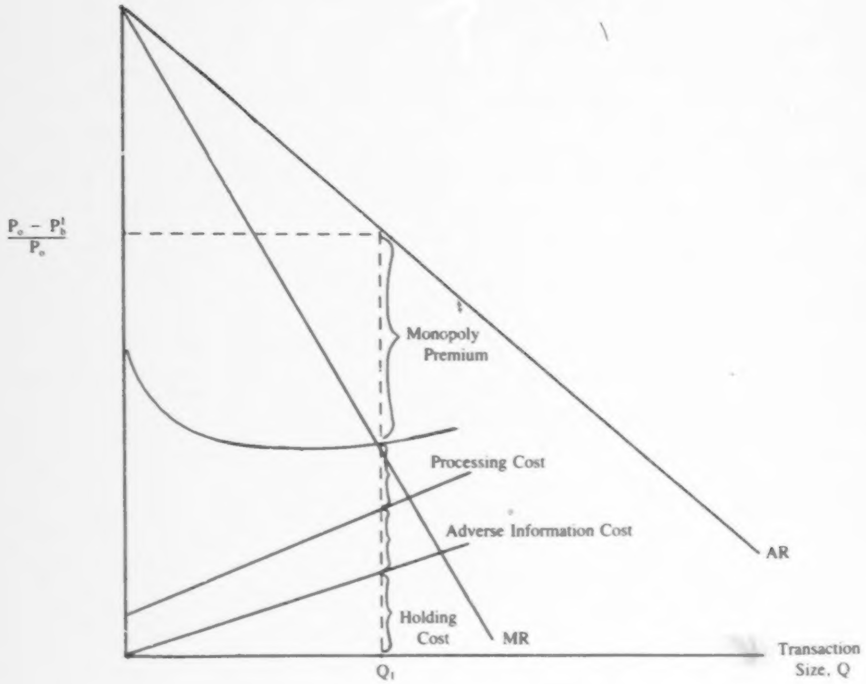
[16] Copeland and Galai (1983) and Glosten and Milgrom (1985).

The pricing of the specialist's brokerage service would be illustrated in a similar manner except that holding costs and adverse information costs would not be relevant.

FIGURE 4:

Specialist's Bid Price Determination



VII. Specialists Portfolio Composition

It is sometimes suggested that the degree of specialists' portfolio diversification will effect their ability to make markets in depth and their willingness to take on inventory risk.[17] Table 2 indicates, however, that the number of stocks varies widely among specialist units, a fact that suggests that the survival of specialist units is independent of their degree of diversification. The importance of diversification may be limited for two reasons. First, the specialist's portfolio of assigned stocks is only a fraction of his total wealth. Specialist units also maintain an investment account, and individual specialists have personal wealth that provides diversification. What is relevant to the specialist is his overall diversification, not the diversification of his trading account alone. Second, specialists, unlike long term investors, go long and short. Even though he is not diversified, a specialist may be able to reduce risk by taking a short position in one stock to offset a long position in another stock. Effectiveness of this type of hedging depends on the correlation of price movements between the two stocks.

Stoll (1978) and Ho and Stoll (1981) show that portfolio diversification against return risk is irrelevant for the level of the spread. Consider a dealer with inventory I. Assume also that the dealer sets bid and ask prices to cover his holding costs and that the other costs are zero. Then, by (3)

$$P_b = P_o[1 - \tfrac{1}{2}\sigma^2 A(Q + 2I)] \qquad (6a)$$

$$P_a = P_o[1 - \tfrac{1}{2}\sigma^2 A(Q - 2I)] \qquad (6b)$$

and the proportional spread is then given as

$$\frac{(P^a - P^b)}{P_o} = \sigma^2 AQ, \qquad (7)$$

which is independent of I and therefore of the diversification of I. This result assumes that the dealer has a fully diversified portfolio of personal wealth.

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[17] Tinic (1972), pp. 83, 84.

In this section the degree of specialist unit portfolio diversification is examined for every unit existing in 1974. Data on specialist unit portfolios were obtained from the New York Stock Exchange publication "Stocks and Specialists" and risk measures were calculated using daily return data for 1973 and 1974. The objective of the analysis is to determine the degree of diversification that specialist units would have achieved had the unit held specialty stocks in a long position, either equally weighted or value weighted.

Table 6 presents decile values for specialist units ranked on the proportion of total risk that is not diversified. This proportion is measured as

$$\sigma^2(e_p)/\sigma^2(R_p)$$

where

$$\sigma^2(R_p) = b_p^2\sigma^2(R_m) + \sigma^2(e_p) \tag{8}$$

$b_p = \sum_{i=1}^{n} x_i b_i$

$\sigma^2(e_p) = \sum_{i=1}^{n} x_i^2\sigma^2(e_i)$

x_i = proportion of portfolio invested in stock i. Under equal weighting $x_i = 1/n$ where n is number of stocks in specialist's portfolio.

b_i = $\mathrm{cov}(R_i, R_m)/\sigma^2(R_m)$. Measured using daily data for preceding two years. The procedure of Scholes and Williams (1977) is utilized.

$\sigma^2(e_i)$ = residual variance of stock i.

$$e_{it} = R_{it} - a_i - b_i R_{mt} \tag{9}$$

$a_i = \bar{R}_i - b_i\bar{R}_m$, where "$-$" indicates mean

$R_{pt} = \sum_{i=1}^{n} x_i R_{it}$

R_{mt} = Return of market on day t.

R_{it} = Return of individual security on day t.

TABLE 6

Percentage of Total Risk Not Diversified
Decile Value for Portfolios of 67 NYSE Specialists Units in 1974

Number of Units with Lower Value	Market Value Weights		Equal Weights	
	Percentage Not Diversified	Number of Stocks in Portfolio	Percentage Not Diversified	Number of Stocks in Portfolio
0	7.54	93	6.21	93
6	19.71	17	12.24	32
13	23.50	33	16.05	33
20	25.86	21	18.86	17
27	28.63	27	21.39	20
34	32.19	16	24.01	21
41	33.74	12	26.19	22
48	36.76	19	29.39	18
55	41.34	19	31.13	10
62	50.17	18	40.10	17
66	66.82	4	79.60	4

TABLE 7

Total Variance of Portfolio Returns, 1974
(Daily Variance × 10,000)

	Specialist Portfolios		Random Portfolios	
	Equal Weights	Value Weights	Equal Weights	Value Weights
Average Variance	1.87	2.27	1.82	2.26
St. Dev. of Variance	.65	.71	.29	.36
Median Variance	1.73	2.12	1.75	2.24
n	67	67	67	67

NOTE: For each random portfolio corresponding to a specialist unit portfolio the variance is the average variance of 25 replications of the random selection procedure (each NYSE stock has equal probability of being selected).

When market value weights are used, the table shows that the proportion of total risk which is not diversified away varies from .668 for a specialist unit with only four stocks to .075 for a specialist unit with 93 stocks, and has a median value of approximately .32. The variation in the proportion of total risk that is not diversified away is somewhat greater when equal weights are used.[18] The wide variation in diversification is consistent with the wide variation in the number of assigned stocks and suggest that the ability to diversify is not essential to specialist units.

The degree of diversification of specialist units was also compared to the degree of diversification of randomly selected portfolios consisting of long positions in the same number of stocks as the number assigned to specialist units. If specialist units seek assignment of stocks from different industries that have relatively low correlation with each other, one would expect the variance of return of specialist portfolios to be less than the variance of a randomly selected portfolio of equal number of stocks. On the other hand, one can argue that specialists might prefer stocks, the returns of which are highly correlated if, at the same time, the arrival of transactions in those stocks is negatively correlated. Negative correlation in the arrival of transactions would cause long positions to be balanced by short positions. Given positive correlation of returns, the risk of such an inventory would be quite small. Table 7 shows that the average variance of specialist portfolios was not significantly different from the average variance of corresponding random portfolios, although specialist units diversification sometimes exceeded and sometimes fell short of the diversification of random portfolios. In other words, within the constraints of the total number of stocks assigned to specialist units, no systematic attempt was made to assign stocks with less intercorrelation of returns than randomly selected stocks.

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[18] Detailed data on each of the specialist units are available on request from the author.

VIII. Fairness and Efficiency of the Specialist System and the Regulatory Response

The stock exchange specialist system has been a subject of criticism in every major study of the securities markets. The Twentieth Century Fund Study of 1935 was particularly concerned about the conflict of interest that may arise because the specialist acts as principal for his own account and as broker for others. The Special Study of 1963 was concerned with specific trading abuses and emphasized a need for greater capital and greater surveillance of specialists in order to insure that specialists acted in a stabilizing manner. The Institutional Investor Study of 1971 examined the degree of specialists' stabilizing behavior and criticized the depth and liquidity provided by certain specialist units. Most of these criticisms derived from the priviledged position of the specialist: (1) his exclusive knowledge of the book of limit orders, (2) his monopoly franchise.

A. Knowledge of the Book of Limit Orders

Under the rules of the New York Stock Exchange, the content of the book of limit orders is known only to the specialist and may not be disclosed publicly except for the best bid and offer on the book along with the size at that bid and offer. This practice has been criticized because it gives the specialist an advantage vis-a-vis other traders. For example, knowing that there are buy orders on the book just below the current market price, limits the specialist's risk of buying for his own account at the market price. Knowledge of the distribution of orders on the book also leads to a better understanding of potential market trends.

Two suggestions have been made to limit this advantage. First, the Twentieth Century Fund Study recommended a separation of the specialist functions as broker and dealer. Separation would eliminate the use by the specialist as principal of information derived from his activities as agent. Such a separation was never implemented. Instead, the NYSE and the SEC have introduced a variety of regulations in an attempt to assure public customer priority over the specialists' dealings. In addition, separation of these functions is not necessarily efficient and may introduce new barriers to competition. On the London Stock Exchange the "single" capacity system in which a firm must choose to be a broker or a jobber (dealer) has come under attack because it restricts competition by prohibiting brokers from entering into the jobbing business.

A second suggestion is to make public the book of limit orders. If all traders have access to the information on the book, none will have a differential advantage. With the existence of television monitors on the New York Stock Exchange floor and in every brokerage office, no technological problem exists in making the book public to all investors in the same way that bids and offers of dealers in NASDAQ are made public. Indeed, the New York Stock Exchange has introduced an ''electronic display book system'' which electronically records and displays limit orders on television screens to the specialist. It would be a short step to make this information generally available.

B. Monopoly Franchise

A second major criticism of the specialist system is that each specialist has a monopoly franchise. First, a monopoly franchise may permit the specialist to charge other brokers a greater floor brokerage fee for handling limit orders than might otherwise be the case if other procedures for handling limit orders were available. Second, it may allow the dealer to charge an excessive bid-ask spread, particularly in thin markets, as shown in Figure 4. Empirical evidence on bid-ask spreads, presented below, indicates that increased competition reduces spreads.

Third, the depth and liquidity of the market in a particular stock will depend on the specialist assigned the stock and his willingness to take risk. If that specialist is poorly capitalized or very risk averse, he will not be willing to make markets in depth at reasonable spreads, an effect that is independent of demand conditions. Under the current system of assigning stocks to specialists, no guarantee exists that the cost functions in Figure 4 are as low as they would be with free entry. Smidt (1971) finds an inverse relation between specialists' returns on capital and their willingness to make markets in depth, a result that would not arise with free entry.[19]

The monopoly power of the specialist is, however, limited by the availability of substitutes for his services. First, by placing limit orders, investors have the opportunity to postpone trading with the specialist if his bid-ask spread is too high. The cost to investors of this strategy is the uncertainty of whether a transaction will take place, the cost of borrowing or lending funds temporarily, and the concern that changing market conditions will cause the limit price to become incorrect and unfavorable. Second, there is some competition from dealers in other markets that are linked electronically with the NYSE through the Intermarket Trading System (ITS). However, such competition is not generally very effective, in large part because most of the order flow is channeled directly to the New York Stock Exchange floor and directly to the specialist post. Third, there is potential competition from other members on the floor, but such competition requires a member to remain at the specialist post and forego other trading. Fourth, there is competition from upstairs market-makers, primarily in block transactions. Such transactions are prearranged upstairs and executed on the floor, frequently without participation of the specialist. Potential increases in upstairs market making are limited by Rule 390, which requires that all transactions in which a New York Stock Exchange member acts as principal be brought to the floor of the NYSE for execution. Rule 390 thus insures that large retail firms will not be able to go into competition with the specialist by starting "upstairs" in-house dealer markets in NYSE stocks.

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[19] See also SEC, *IIS* (1971), Chapter XII, page 1925.

C. Regulation

The response of the NYSE and, until recently, of the SEC to criticisms of the specialist system has been to increase regulation and oversight of specialists. Regulation has avoided hard and fast rules and has been grounded on a statutory standard that ". . . rules and regulations shall restrict his dealings so far as practicable to those reasonably necessary to permit him to maintain a fair and orderly market." The implementation of this standard has posed difficulties because it requires definition of a "fair and orderly market" and a mechanism for determining transactions which are not consistent with that standard. The NYSE has established a variety of tests of specialist performance that measure the degree of price continuity, the extent to which the specialist trades against the price trend, and the size of bid-ask spreads.[20] However, such measures of performance are difficult to interpret. A lack of price continuity may be due to a justified price change in the stock. Specialists cannot, and should not, be expected to trade against a price trend that is justified by the fundamentals. A variety of factors unrelated to the specialist's own performance can justify a high bid-ask spread.

As a result of these measurement difficulties, considerable controversy still exists as to the performance of specialists, the effectiveness of regulation of sepcialists, and the desirability of the specialist system. With the passage of the Securities Acts Amendments of 1975, the SEC and the Congress have moved away from regulation as a means of ensuring performance to competition as a means of disciplining market participants. The NYSE responded to the call for greater competition in 1976 by permitting competition among specialists in the same stocks and by establishing a category of Registered Competitive Market Maker (RCMM). However, direct competition among specialists has not occurred, and the RCMM provides a back-up function rather than an alternative to other specialists. If serious competition in the provision of dealer services is to arise in NYSE stocks, it will have to come from outside the floor of the NYSE; for on the NYSE the specialist continues to maintain his privileged position and his privileged access to the order flow. In the following sections of this paper some of the issues on which the controversy about the specialist system hinge are discussed. In the next section the role of the specialist in stabilizing prices is examined. The succeeding sections are concerned not with the impact of the specialist on securities prices directly but with the cost to the public of the services of the specialist as provider of immediacy.

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[20] See, for example, New York Stock Exchange, *The Quality of the New York Stock Exchange Marketplace in 1979*, (March 6, 1980).

IX. The Specialist and Price Stabilization

Regulators and the public have questioned whether specialists stabilize or destabilize security prices. Economists generally argue that all traders, including specialists, have an incentive to stabilize prices because stabilization is profitable. The role of specialists in stabilizing prices has been viewed from several perspectives.

A. Specialist as Mechanical Stabilizer

Because trading is in lumpy quantities and at prices that change discretely, transactions differing slightly in quantity or price may not be executed. For example, a seller of 300 shares at $20 per share cannot trade with a buyer of 200 shares at $20 per share, since quantities are different. The objective of the specialist as mechanical stabilizer is to facilitate these kinds of transactions and to eliminate temporary discontinuities in demand; that is, the specialist performs the function of demand smoothing (Beja and Hakansson 1979). This perspective sometimes leads to recommendations that the function of the specialist be automated or otherwise given to an employee of the exchange. Such a recommendation, however, fails to recognize that price fluctuations are due to more fundamental reasons than the mechanics of the trading process and can result in significant risks that a computer or an employee of the exchange has no interest in minimizing. Some of the arguments for and against automating the specialist are presented in Black (1971).

B. The Specialist as Passive Stabilizer

The most common view is that of specialist as a passive stabilizer who buys when prices are depressed and sells when prices are pushed up. The specialist is passive in that he does not anticipate price movements. Instead, the specialist reacts to the order flow, buying when there is an excess supply and selling when there is an excess demand. When the fundamental price does not change, passive stabilization is a profitable strategy.

The New York Stock Exchange's tests of the specialist's performance in maintaining a "fair and orderly market" are tests of stabilizing behavior in this sense. The NYSE finds that the specialist buys on down ticks and sells on up ticks in over 90 percent of all transactions (NYSE 1980). The SEC's *Institutional Investor Study* (U.S. SEC 1971, vol. 4) also found that the specialist bought on price declines and sold on price increases. A similar pattern is observed by Stoll (1976) for competing NASDAQ dealers. Barnea (1974) argues that a stabilizing specialist will reduce the short-term variance of a stock relative to the long-term variance of the stock as compared with a non-stabilizing specialist. Schwartz and Whitcomb (1976) note that Barnea's measure of stabilization depends on the degree of serial correlation in a stock's return, which may be affected by other forces as well as by the specialist.

It is important to distinguish between an ex post stabilizer and an ex ante stabilizer. As noted earlier, an auctioneer acting as an ex post stabilizer in a call auction market, after seeing all other orders, has a substantial advantage and stands to earn a monopoly rent. An ex ante stabilizer is one who sets bid and asks prices before seeing the order flow and agrees to buy or sell at those prices. In this second case of ex ante stabilization, the specialist can go bankrupt in trying to absorb the random order flow as Garman (1976) has shown. In the real world, the specialist protects himself against this possibility by limiting the size of the transaction at his quote and adjusting his quote over time to avoid excessive accumulation or decumulation of inventory. In other words, although the specialist is passive and responds to the order flow, he learns from the order flow and adjusts his prices accordingly. The possibility of earning a monopoly profit still exists if competing market makers are not present; but there is greater uncertainty for a specialist willing to set ex ante prices, even for limited quantities, than for a specialist who sets prices after observing the order flow.

Cohen, Maier, Schwartz, and Whitcomb (1977) argue that the activity of stabilization has external benefits that cannot be captured by the specialist doing the stabilizing. As a result, they argue there should be a single stabilizer in each stock who is rewarded over and above his profits from stabilizing for performing the social service of stabilization. This position is consistent with the NYSE view that the specialist has an affirmative obligation to maintain a fair and orderly market and should be subject to special standards, in return for which he receives special benefits such as a privileged position on the floor and knowledge of the book of limit orders.

The opposing view is that the specialist, like any other dealer, is a profit-maximizing entity that provides stabilization as a by-product. The fact that 90 percent of specialist transactions are stabilizing may simply reflect the fact that buying on price declines and selling on price increases is generally profitable. Stoll (1976) finds that the stabilizing behavior of unregulated NASDAQ market makers is the same as that of regulated exchange specialists, and concludes that market makers behave roughly the same way with respect to stabilization whether they are regulated or not.

C. The Specialist as Active Stabilizer

The specialist is sometimes viewed as an active stabilizer who forsees market trends and moves prices in the correct direction. He does not respond to the inflow of orders. Instead, he initiates transactions in order to move the price in a particular direction.

Whether a specialist is an active stabilizer, a passive stabilizer, or both can be inferred on the basis of the following regression framework (Stoll 1976):

$$\Delta Q_t = a_o + a_1 R_t + a_2 R_{t+1} + a_3 \Delta Q_{t-1}$$

where

ΔQ_t = inventory change during day t.

R_t = percentage price change during day t.

Passive stabilization implies $a_1 < 0$—that is, inventory changes opposite to the price change during the day. Active stabilization implies $a_2 > 0$—inventory changes in the same direction as the next day's price change.

Although a regression framework was not employed, the *Institutional Investor Study* (1971) found specialists' behavior to be consistent with $a_1 < 0$ but $a_2 < 0$. The results are in Table 8, replicated from the *Institutional Investor Study*. Examination of the row averages shows that specialists' inventory changes were opposite to the price changes on the same day, which implies passive stabilization. Examination of the column averages shows a somewhat weaker negative relation between inventory changes and the following day's price change.

In a study of NASDAQ stocks Stoll (1976) found $a_1 < 0$ but $a_2 < 0$, which corresponds to the *Institutional Investor Study* results. These results imply that inventory changes of dealers respond to the same day's price change in a passive manner and do not anticipate the following day's price change. Indeed, because dealers tend to buy on days prior to a price decline and sell on days prior to a price increase, they make losses with respect to the next day's price change. Stoll found the coefficient, a_3, is negative, which means there is a tendency for inventory to return to a normal level.

TABLE 8

Average Net Inventory Change of NYSE Specialists, on Given Day By Change in Price of Stock Relative to S&P on the Given Day and the Following Day
(Thousands of Dollars)

Percent Change in Price of Stock Relative to S&P on the Given Day	Percent Change in Price of Stock Relative to S&P on the Following Day							
	−5.0 or less	−4.9 to −3.0	−2.9 to −1.0	−0.9 to 0.9	1.0 to 2.9	3.0 to 4.9	5.0 or over	Row Average
5.0 or over	−74	−12	−131	− 67	− 89	−106	−172	−90
3.0 to 4.9	−75	−37	− 73	−104	−105	− 61	− 58	−87
1.0 to 2.9	−13	−27	− 25	− 59	− 73	− 52	− 5	−51
−0.9 to 0.9	5	6	10	1	− 2	0	− 15	2
−2.9 to −1.0	35	24	37	53	38	17	− 40	42
−4.9 to −3.0	144	98	144	91	72	68	− 31	88
−5.0 or less	67	166	101	185	131	86	154	137
Column Average	22	10	8	1	− 10	− 12	− 24	

Source: SEC *Institutional Investor Study* (1971), Ch. 12, p. 1876, Table XII-15. The data covers 93 stocks over the period 7/1/68—9/30/69.

X. Empirical Evidence on the Quoted Bid-Ask Spread

A. Factors Affecting the Quoted Spread

Empirical studies of the bid-ask spread, while not always derived from an explicit theoretical model such as the one summarized earlier, usually show that spreads depend on factors identified in the model: order costs, inventory risk, adverse information, monopoly power. Empirical studies of bid-ask spreads on exchange markets have been carried out by Demsetz (1968), Tinic (1972) and Branch and Freed (1977). Spreads in the over-the-counter market are examined by Benston and Hagerman (1974), Stoll (1978b) and Tinic and West (1972).

The bid-ask spread is usually measured as a proportion of the stock price, and the key variables explaining variations in the proportional spread across stocks include:

1. An activity variable such as volume of trading, shares outstanding, or number of shareholder. Justification for this variable is that the greater the activity, the shorter the dealer's holding period and, therefore, the lower his risk. The variable may also be related to economies of scale in order processing.
2. A risk variable such as variance of return of the stock or the components of the variance—systematic risk and unsystematic risk. For a given holding period, the greater the variance, the greater the risk to the dealer and, therefore, the greater the spread. It has also been argued that the level of unsystematic risk may be related to the amount of adverse information in a stock.
3. A measure of competition such as the number of competing markets (in the case of the New York Exchange specialist) or the number of competing dealers in NASDAQ.

These three variables tend to be significant in explaining the spread. The activity variable has a negative sign, the risk variable a positive sign, and the competition variable a negative sign (greater competition implying lower spreads).

A number of other variables are sometimes included. The price per share of a stock usually has a significant negative effect on the proportional spread, i.e., lower priced stocks having higher proportional spreads. This effect could be due to a fixed cost which is a larger fraction of the transaction value when the price is low, to the fact that low priced stocks are riskier and to the fact that the minimum bid-ask spread of 1/8th of a dollar tends to cause spreads to be higher in low priced stocks. Tinic (1972) notes that the greater number of specialty stocks carried by a unit, the greater the spread in a particular stock, and he ascribes this effect to diseconomies of scale of handling a greater number of stocks. He also finds that the greater number of institutions holding an issue, the lower the spread.

Given the criticisms of the specialist's monopoly franchise, the most interesting finding of these studies is the reduction in the spread associated with an increase in competition. However, the New York Stock Exchange has noted that an increase in competition coming from other markets also fragments trading and reduces volume on the New York Stock Exchange. The reduction in volume, it is argued, may increase spreads by more than competition reduces them. The issue then becomes whether a single market with competing dealers, as is the case in the NASDAQ market, is superior to a single market with a single dealer, as is the case on the New York Stock Exchange.

B. NYSE v. NASDAQ

If the monopoly premium charged by the specialist is substantial and if competition eliminates this premium, one would expect lower spreads in NASDAQ than in the NYSE, and one would therefore argue that a system of competing dealers is preferable. The empirical evidence of Newton and Quandt (1979) suggests, however, that quoted spreads in NASDAQ are higher than quoted spreads for comparable NYSE traded stocks. According to their analysis, the inside quote in NASDAQ is approximately .50 percent (of the stock price) greater than if the stock were traded on the NYSE. (The inside quote is the lowest ask price of any dealer in the stock minus the highest bid price of any dealer in this stock.) They are careful to adjust for differences in volume and in other characteristics of the stocks in these two markets in reaching this conclusion. While one can debate the adequacy of their empirical procedure, let us assume that the basic empirical findings of Newton and Quandt are correct. What can explain the difference they find?

First, consider inventory holding costs. Unlike the NYSE, the holding costs of any dealer in NASDAQ must take account of the fact that other dealers in the same stock exist. For example, an investor selling ten round lots in NASDAQ can simultaneously sell one lot to each of ten dealers. Each dealer, therefore, has greater difficulty in eliminating unwanted inventory than if only one round lot had been sold because other dealers are also attempting to eliminate unwanted inventory. In order to realize the same return on his investment, each dealer must, as a result, quote a higher spread than if he were the only dealer. An investor selling ten round lots on the NYSE would sell one lot at the specialist's bid price but might be able to sell additional quantities only at progressively lower prices. In effect, the NASDAQ quote can represent greater market depth than the NYSE quote—100 shares to each of ten dealers as opposed to 100 shares to the specialist.[21] The higher NASDAQ quoted spread may, therefore, reflect greater liquidity.

With respect to adverse information costs, the NYSE specialist system may be structurally superior in the sense that it permits the specialist to detect the presence of informational trading, thereby allowing him to adjust his bid and ask prices before informationally motivated trades occur. For example, suppose that large transactions are more likely to be motivated by information trading than small transactions. The specialist, because of his central position in the market place, may be more readily able to infer the presence of large transactions than one of many NASDAQ dealers. He can, therefore, limit the quantity he trades and adjust prices in a way not possible when there are many competing dealers. Thus, losses to informational traders may be greater on NASDAQ than on the NYSE and therefore justify a higher quoted spread.

Finally, the fact that the NYSE market spread represents not only the specialist but also the book of limit orders lowers the NYSE spread below what it would be if it represented only the specialist trading for his own account; and this may explain the higher NASDAQ spread. Because Newton and Quandt selected stocks stratified by size, their average spread is most closely approximated by an equally-weighted average spread for all NYSE stocks. Stoll and Whaley (1983) calculate an equally-weighted spread of 1.44% for NYSE stocks in 1979.[22] According to the Newton and Quandt results, NASDAQ spreads were .50 percent higher, i.e., 1.94 percent. If the specialist spread had been 1.94 percent of the price, approximately what spread, x, for the book of limit orders would be implied to yield a NYSE average spread of 1.44 percent? Using the data from Table 3 on the proportion of specialist's trades as dealer and broker, this is determined as

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[21] See Ho and Stoll (1983) for a more formal presentation of this argument. The argument assumes the specialist's quote is for fewer shares than the sum of the shares that all NASDAQ dealers would trade.

[22] Stoll and Whaley (1983), Table 5.

$$\begin{aligned} 1.44 &= \tfrac{1}{3}(1.94) + \tfrac{2}{3}(x) \\ x &= 1.19\% \end{aligned}$$

Assuming a stock price of \$30, this means that if the book bid or ask were on average .5(.0194 − .0119) (30) = \$.11 inside the bid or ask that the specialist would have quoted, the observed difference between NYSE and NASDAQ quotes could be explained. This is certainly not out of the question for two reasons.

First, investors placing limit orders are like dealers for their own account, and one would expect investors fairly frequently to have portfolio positions that would allow them to offer better prices than the specialist just as some dealers in a competing market are periodically in a better position than other dealers on one side of the market. Since there may be more limit orders competing with the specialist than the number of competing dealers in NASDAQ, NYSE spreads may be lower than NASDAQ spreads.

Second, to the extent that limit orders are not adjusted instantaneously in response to market price changes, limit orders tend to narrow the spread as market prices change. For example, consider a stock quoted at \$29.75-\$30.25 by the specialist. Assume that a limit buy order at \$29.63 is on the book. Now suppose the "true" price of the stock falls from \$30 to \$29.50. Left to himself, the specialist would now quote \$29.25-\$29.75. However, because of the limit order, the specialist will actually quote \$29.63 bid (for the book) and \$29.75 ask (for his own account), resulting in a market spread much less than the specialist's personal spread. If the limit order price could be adjusted quickly, it would be lowered to \$29.38 or \$29.25, where the limit order would still have precedence over the specialist's bid. But this may be difficult or costly to do. Failure to adjust limit prices quickly thus presents market orders the opportunity to trade at favorable prices—in the example, to sell at \$29.63 rather than at \$29.25. In effect, limit orders grant an option to the market to trade at the limit price. Whenever that option has exercise value, as in the example, the quoted NYSE spread is less than it would be in a pure dealer market.[23]

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[23] Copeland and Galai (1983) model the specialist's spread as the granting of an option. However, since the specialist can adjust prices easily, then argument would seem to be more applicable to limit orders, as used here.

XI. Realized Spreads

While the emphasis in empirical work has been on the spread quoted by the specialist, it is important to note that the spread realized is likely to be less than the spread quoted. Only if bid and ask prices do not change systematically according to whether a transaction is a specialist purchase or a specialist sale, will the spread realized by the specialist equal the quoted spread of the specialist. In this case, a specialist who buys at P_t^b, the bid price at time t, can expect on average to sell at P_t^a, the ask price at time t. On the other hand, if bid and ask prices have a tendency to fall after a specialist purchase and a tendency to rise after a specialist sale, the realized spread will fall short of the quoted spread. In other words, the specialist who buys at P_t^b cannot expect to sell at P_t^a. Instead, he sells on average at an ask price at time t + 1, P_{t+1}^a that is less than P_t^a.

A. Sources of the Difference Between Quoted and Realized Spreads

The difference between the quoted spread and realized spread can be ascribed to two factors: inventory adjustment by the specialist and informational trading. Stoll (1978a) and Ho and Stoll (1981, 1983) have shown that a dealer changes his bid and ask prices immediately after a transaction to induce offsetting transactions that would tend to bring the dealer's inventory back to the desired level: after a purchase by the dealer, he lowers his bid price to discourage additional public sales to him and he lowers his ask price to encourage public purchases from him. Thus, even without a change in the ''true'' price of a stock, successive transactions at the bid and ask will not yield the quoted spread.

Second, the realized spread is less than the quoted spread because the specialist loses to informed traders. Informed traders will sell at the specialist's bid when they anticipate a price decline, and they will buy at the specialist's ask when they anticipate a price increase. If informed traders are more often right than wrong, the equilibrium price of the stock will tend to fall after a dealer purchase and will tend to rise after a dealer sale, thereby generating losses for the dealer. As noted earlier, Stoll (1976) found that the stock's return on day t+1 is negatively correlated with the dealer inventory change on day t, which is evidence of informational trading.

Assuming the dealer can reverse a position in one period, these views imply that

$$P^a_{t+1} - P^b_t < P^a_t - P^b_t$$

and

$$P^a_t - P^b_{t+1} < P^a_t - P^b_t$$

where

$P^a_t - P^b_t$ = quoted spread at time t.

$P^a_{t+1} - P^b_t$ = realized spread, dealer purchase followed by dealer sale.

$P^a_t - P^b_{t+1}$ = realized spread, dealer sale followed by dealer purchase.

TABLE 9

Quoted Spreads and Realized Spreads, Direct Evidence

	Percentage[1] Quoted Spread	Percentage[2] Realized Spread	Average[3] Stock Price
1960	.85	.140	50.08
1975	.74	.511	27.00
1976	.58	.403	32.76
1977	.58	.226	32.78
1978	.67	.245	30.19
1979	.70	.362	30.92
1980	n.a.	.215	34.43
Average 1975-1980	.65	.327	

[1] From Stoll and Whaley (1983), Table 5. The percentage spread for each stock was calculated as the average of beginning and end-of-year values of 100 (ask-bid)/½(ask + bid). Bid and ask prices are from Francis Emory Fitch, "Stock Quotations on the NYSE." The percentage spread in the table is a value-weighted average of spreads on individual stocks.

[2] Calculated from Table 5 and the average share price in this table as follows: (per share trading gains + per share investment account gains) 2/(average stock price).

[3] From 1982, *NYSE Fact Book*, p. 71. Average share price at beginning and end of each year calculated as total market value of all shares divided by total number of shares. Average stock price in this table is average of beginning-of-year and end-of-year values.

B. Evidence on Realized Spreads

Direct evidence on the average realized spread of specialists is contained in Table 9. The per share trading and investment account revenues of specialists in their assigned stocks represent one-half the realized spread. In 1979, for example, specialists earned an average of .051 + .005 = .056 from buying or selling one share (See Table 5). Since the spread represents revenues from a purchase and a sale, the realized spread in 1979 was 2(.056) = 11.2 cents per share. For the period 1975 to 1980, the lowest realized spread was 6.7 cents in 1977; the highest 13.8 cents in 1975. These figures for the realized spread are quite small. Indeed, they are frequently smaller than the minimum quoted spread of one eighth point or 12.5 cents per share.

Table 9 presents data on the weighted average percentage quoted spread for New York Stock Exchange stocks and on the percentage realized spread calculated from Table 5 and the average NYSE share price. Note that the weighted average percentage quoted spread in Table 9 is considerably lower than the typical spread on the New York Stock Exchange because large stocks, which are given a heavier weight, have substantially lower spreads. For example, in 1979 the equally-weighted percentage spread for New York Stock Exchange stocks was 1.44 percent of the price as compared with the weighted average spread of .7 percent of the price. Table 9 shows that the realized spread is on average about one half the quoted spread in the years 1975 to 1980. This difference appears large, particularly in view of the fact that the quoted spread represents quotes not only of the specialist but also of the book of limit orders.

The difference between the quoted spread and the realized spread in Table 9 reflects per share realized losses to information traders and holding costs. This difference varies from a low of .177% in 1976 to a high of .485% in 1980 (assuming a quoted spread of .70% in that year). Hidden in these data is the substantial variability from specialist to specialist, from stock to stock, and from time period to time period in the losses to information traders.

Indirect evidence on the realized bid-ask spread is provided by Roll (1984). Roll notes that trading at the bid and ask price induces negative serial dependence in transactions prices that can be used to estimate the market spread. On the assumption that bid and ask prices are uncorrelated with the transaction process, he demonstrates that

$$\text{Spread} = 2\sqrt{-\text{cov}}$$

where cov is the first order serial covariance in price changes.

Based on daily data for the period 1975 to 1980, Roll calculates an implicit spread of .51 percent (this is an average of Roll's annual numbers). For the entire period of 1963 to 1982 Roll's estimate of the spread is .298 percent. While Roll himself and Glosten (1984) have criticized these figures as too low in comparison to quoted spreads, they are of the same order of magnitude as the direct estimate of the realized spread in Table 9. Indeed, these figures derived from daily data seem more reasonable than Roll's estimate of a spread of 1.74 percent based on weekly returns.

As pointed out in the earlier example, the realized spread is reduced in comparison to the quoted spread by adjustments of the quote as a result of transactions. Roll's model does not take account of these adjustments. As a result, his procedure of backing out the spread from the observed covariance, in effect, backs out the realized spread, not the quoted spread. Glosten (1984) provides a framework for relating the covariance to the quoted spread.

XII. Summary and Conclusions

Despite a variety of economic and regulatory changes that have affected securities markets, the specialist system continues to be central to the operation of the New York Stock Exchange Market. In 1983 there were 412 individual specialists as compared with 381 in 1975. The movement toward a national market system and the call for greater competition among markets have apparently not reduced the attractiveness of the specialist's position.

The specialist is central to the operation of the NYSE, participating as a dealer or broker on one side of about 72 percent of the reported volume and of about 91 percent of the volume not prearranged in "upstairs" offices.

The NYSE is not an auction market in which public investors, represented by their brokers, trade directly on the floor. Only about 9 percent of transactions not prearranged in upstairs markets appear to be carried out in an auction market framework, primarily at the opening and after trading halts. The NYSE is a dealer and brokered market in which floor intermediaries—the specialists—facilitate trading.

About 48 percent of reported volume represents limit orders, either on the buy or the sell side. This implies that limit orders play an important role in narrowing the market bid-ask spread and maintaining continuity and depth of the NYSE market.

In the aggregate, specialists derive about equal amounts of revenue from their activities as brokers and as dealers, although they participate about twice as often as brokers. The average per share floor brokerage rate implied by the data is 2.1 cents per share in 1978. The average per share earnings as dealer on a round turn range from a high of 13.8 cents per share in 1975 to a low of 7.4 cents per share in 1977, 1978 and 1980.

A model of the specialist unit, which incorporates the factors that determine the unit's bid-ask spread, is summarized in this monograph. These factors include order processing costs, inventory holding costs, adverse information costs, and a monopoly premium.

While it is sometimes suggested that the degree of diversification of specialist units affects the unit's ability to make markets in depth and its bid-ask spread, empirical evidence indicates that there is a wide variability among units in the number of stocks and in the degree of diversification of those units. Furthermore, the degree of diversification achieved by any unit with the number of stocks assigned to it is no greater than if those stocks had been chosen at random. These findings suggest that the degree of diversification of specialist units is not critical to their survival.

The specialist's privileged access to information in the book of limit orders and his quasi-monopoly position are criticized, but it is noted that the adverse effects of the specialist's quasi-monopoly position are limited by the ability of investors to place limit orders and buy competition from dealers in other markets, including "upstairs" markets. NYSE Rule 113 inhibits the specialists' ability to compete for institutional block trading business, which is carried out by upstairs block trading firms. On the other hand, NYSE Rule 390, which requires all NYSE member firms transactions as principal to be brought to the floor of the New York Stock Exchange, enhances the order flow at the specialists' post.

The specialists' privileged position has, in part, been justified by the affirmative obligation imposed on him to "maintain a fair and orderly market" at a reasonable cost to the public. This monograph reviews the role of the specialist as a mechanical stabilizer, a passive stabilizer and an active stabilizer. Evidence suggests that specialists are passive stabilizers, but it suggests that dealers in unregulated markets also behave as passive stabilizers.

Empirical evidence on the cost to the public of specialist services as reflected in the quoted bid-ask spread is summarized. The empirical finding that the inside quote on NASDAQ is higher than the NYSE quote for comparable stocks is analyzed. Two factors are stressed as possible explanations for the higher spreads in NASDAQ. First, the limit order book plays an important role in narrowing spreads on the NYSE market. Second, the existence of many competing dealers in NASDAQ, each willing to trade a given number of shares, may deepen the market beyond the number of shares the specialist would be willing to trade at his quote and therefore justifies a higher bid-ask spread on NASDAQ.

An important contribution of this monograph is to provide evidence on the difference between the quoted spread and the realized spread. The theoretical model of the specialist indicates that bid and ask prices will be changed subsequent to a transaction in order to minimize inventory holding costs and adverse information costs. After a specialist purchase, for example, the bid and ask price are reduced in order to discourage additional specialist purchases and in order to encourage specialists sales that eliminate the inventory position. Bid and ask prices are also reduced because a sale by the public increases the probability that the true underlying price of the stock has fallen. Such price adjustments cause the realized spread to be less than the quoted spread. Direct evidence on the realized spread from data on specialist revenues and volume of trading indicates that the realized spread is approximately one half the quoted spread. This evidence is consistent with indirect evidence in Roll (1984) based on the serial covariance of returns.

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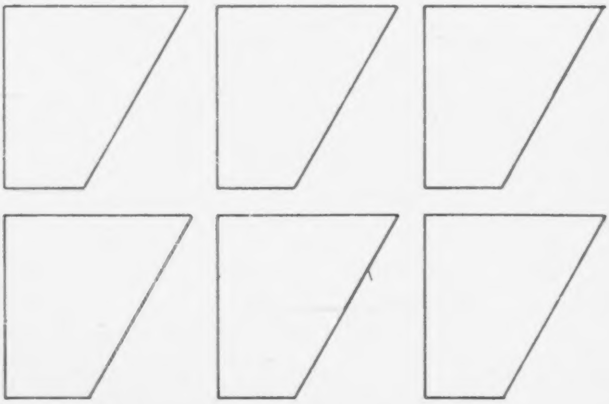
Monograph 1985—4/5

An Analysis of the Causes Of Savings and Loan Association Failures

By George J. Benston



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By George J. Benston

Professor of Accounting, Economics, and Finance, Graduate School of Management, University of Rochester. The data used for most of the study were provided by Cates Consulting Analysts, Inc. and financial support was received from Lincoln Savings and Loan Association. The excellent help of Jane Cates, Gary Alpert, and Tony Greig is gratefully acknowledged. Responsibility for the research is entirely the author's.

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Introduction and Executive Summary

The Record

Since January 1981, over 230 savings and loan associations (SLAs) officially failed, 6.0 percent of the number operating at the beginning of the decade. Over 300 more appear to have had mergers arranged by the authorities to avoid failure. This is a record exceeding that disaster of the Great Depression, when 526 SLAs were suspended from 1930 through 1933 (4.4 percent of the number in 1930.) Even more serious, an additional 500 or more SLAs are economically insolvent, although the authorities have chosen not to close them down. As of June 30, 1985, some 461 had negative equity according to generally accepted accounting principles (GAAP), which tend to overstate equity because mortgages and other fixed-interest long-term obligations are carried at book rather than at lower market values. These institutions are kept open by a fiction called regulatory accounting principles (RAP), and by Federal Home Loan Bank Board (FHLBB) net worth certificates, which allow insured SLAs to misstate their equities even more. But even by these measures (or mismeasures), some 830 SLAs have equity of less than three percent of their total assets.

Reasons for Failures (Chapter 1)

The reasons for the failures of SLAs in the 1980s are analyzed in the first chapter of this monograph. This analysis is a necessary prelude to actions designed to relieve the present situation, prevent future failures, and permit the savings and loan industry (or at least the remaining associations) to serve the public. To these ends, the financial statements of the 202 SLAs that failed officially between January 1, 1981 and August 31, 1985 were examined statistically. The financial ratios of the failed associations in the year before they failed and the year before that were analyzed individually and together, and were compared with the ratios of 808 similar associations that did not fail. In addition, the failures of SLAs in the states that liberalized laws in the 1980s to allow SLAs to invest a greater percentage or all of their assets directly in such assets as real estate and equity in service corporations—California, Texas, Florida, Arizona, Ohio, and Louisiana—were analyzed separately.

It should be noted that the failures analyzed are those that the FHLBB chose officially to close or merge. As the data mentioned above indicate, hundreds more SLAs are said (by FHLBB staff economists) to have been merged to avoid official failure, and additional hundreds have not been closed even though they are economically (market value) insolvent. Thus, the data analyzed tend to include associations that failed because of credit and direct-investment losses and asset revaluations and exclude many associations that experienced but did not have to record losses due to higher interest rates.

Despite this bias in failure causation, the data analyzed lead to the conclusion that the principal cause of the failures was the specialization of SLAs in fixed-interest-rate long-term mortgages and bonds that were funded with short-term savings. This unbalanced portfolio was imposed by regulation and supported by tax subsidies and custom. When short-term interest rates rose from approximately seven percent in 1978 to sixteen percent in 1981, SLAs faced a run off of deposits ($25 billion in 1981 and $6 billion in 1982) while they still held mortgages paying an average of nine to ten percent. Further, while Congress began to deregulate deposit interest rates in 1980, which helped stem the outflow of depositors' funds, this served to increase the thrifts' cost of funds to the point where interest margins often were negative. Fraud also played a role in the failures, as it had in previous periods.

In April 1981, savings and loans were permitted to make adjustable-interest-rate mortgages (ARMs) and in 1982 the Garn-St Germain Depository Institutions Act relaxed restrictions on loans that could be made to consumers and businesses and on commercial real estate, and on the amount of commercial paper and debt securities that SLAs could hold. In 1983 several states relaxed their regulations and permitted state-chartered SLAs to invest directly in real estate and other ventures. The partial deregulation of thrifts gives rise to the question of whether the failures in 1984 and 1985 were due to reasons other than increases in market rates of interest, especially since interest rates fell considerably from the 1980-81 level. In particular, the more recent failures have been blamed on brokered deposits, high rates of growth, inept expansion into consumer loans, poorly-made nonmortgage commercial loans, bad nonresidential loans and mortgages (in particular, loans made for the acquisition and development of real estate and for construction—ADC loans), and direct investments in real estate, service corporation equity, and similar owned income producing assets.

The analysis presented in Chapter I supports only some of these claims. The deregulation of interest rates made it possible for

SLAs to grow by bidding for funds from investors located outside their market areas. This garnering of funds was facilitated by two important developments. One was the 1980 increase in Federal Savings and Loan Insurance Corporation (FSLIC) insurance coverage from $40,000 to $100,000 per account in each insured SLA. The second was the lower transaction and administrative costs of making and keeping track of deposits that resulted from improvements in computer technology. Brokering of deposits additionally reduced the cost of investor and SLA transactions for some institutions. Others used their own personnel and direct advertising to obtain deposits. The two developments, together with the weakened financial condition and economic insolvency of many SLAs caused by interest-rate-increase-induced losses, tend to encourage excessive risk-taking by SLA managers and owners. Considering the incentives and likely outcome of risk-taking behavior, the number of failures resulting from such behavior does not appear to be very great.

The data indicate that the failed SLAs, compared to their nonfailed peers, have significantly greater (relative to their size) amounts of non-retail deposits in the form of jumbo (over $100,000) certificates of deposit (CDs), federal home loan bank advances, and brokered deposits. In a multivariate analysis, the level of large liabilities to earning assets is significantly related to failure. However, brokered deposits are not significantly related, which indicates that this form of gathering funds alone is not a determinant of failure.

Deregulation that permitted SLAs greater powers is not found to have been detrimental to their solvency. Consumer and nonmortgage commercial loans have not been extensively made, nor are they associated with SLA failures. Indeed, in the multivariate analysis, higher levels of consumer loans to total loans are significantly associated with lower rates of failure. Direct investments taken alone are significantly higher at the failed SLAs, the mean difference, however, being only 0.4 percent of total assets. Analyzed with the other variables in the multivariate analysis, direct investments are not significantly related to failure. (Direct investment is investigated further in Chapter II.)

Acquisition, development, and construction (ADC) loans could not be analyzed fully because these data are only partially obtained and incompletely released by the FHLBB. However, loan fees, foreclosures, and nonresidential mortgages are significantly higher (in relative terms) at the failed institutions compared with their surviving peers. Except for fees, these variables are also significantly related to failure in the multivariate analysis.

Finally, the amount of FSLIC payouts was related to the financial ratios for the 95 failures for which the FSLIC payouts were released. The only variable that consistently explains the payout amounts is total assets.

The remaining chapters analyze several imposed and proposed "solutions" to the failure problem, including the returns and risk from direct investments (Chapter II), growth (Chapter III), and the effectiveness and risk of using adjustable-rate mortgages (ARMs) and brokered deposits (Chapter IV) as partial solutions to the SLA "crisis." The final chapter presents conclusions and some suggestions for dealing with the current situation.

Direct Investments—Return and Risk (Chapter II)

Direct investments are assets that are owned and managed by an SLA, other than assets used for its regular operations or real estate acquired in foreclosure proceedings. Generally, direct investments are in land held for development, residential and commercial building projects, and equity in service corporations that deal in real-estate-related properties and services. However, other assets (such as non-real-estate businesses) and equities (such as traded securities) may be direct investments.

In March 1985 the FHLBB adopted a regulation restricting direct investments by insured SLAs to ten percent of total assets or twice capital, unless supervisory permission is granted to invest beyond these limits. At about the same time, it defined direct investments to include ADC loans with profit-sharing features and low-borrower equity. This regulatory definition combines very different assets that pose widely different risks. With an ADC loan, the SLA does not own and usually cannot directly manage or monitor the property in which it has invested its funds. Hence, ADC loans pose inherently greater risks of loss than do "true" direct investments, which do confer ownership rights and management authority on the SLA. Furthermore, regulatory accounting principles (RAP) give weak SLAs incentives to make risky ADC loans (but not direct investments) because up to 250 basis points of up-front fees can be recorded on such loans, while income on direct investments cannot be recorded until it is realized. In addition, reductions in the market value of direct investments, but not of loans (that are not in default), must be recorded at year-end. In any event, data on the construction loan portion of ADC loans that are defined by the FHLBB to be direct investments are not reported separately.

The return and risk of "true" direct investments are analyzed in Chapter II. The studies published by the FHLBB in support of its limitation on direct investments are analyzed in this chapter and found wanting. These studies are seriously incomplete or inconsistent in their use of data and methodology. Consequently, new analyses were undertaken.

The data used in these new analyses are taken from the 2377 associations that reported either continuous direct investments or none at all over the three years ended June 30, 1984. (The excluded observations also were analyzed; no bias in the results is indicated.) In addition, data from SLAs in California, Texas, Florida, Arizona, Ohio, and Louisiana were analyzed separately, with results similar to those found for the nationwide data. Nationally, the average annual returns on direct investments of 3.75 percent are considerably greater than the average return of −0.16 percent reported on other assets. With direct investments included, the average SLA earned −0.04 percent on total assets per year over the three years. Furthermore, the returns increased as the percentage of direct investments held increased.

The risk on direct investments was analyzed in several ways. A portfolio analysis shows that the risk as measured by the standard deviation on returns on total assets is slightly lower with direct investments included than with these assets excluded. However, risk as related to the issue of solvency should consider only negative returns (semi-variance) because greater variance that is due to higher positive returns reduces the risk of insolvency. The data indicate that SLAs with total direct investments of $500,000 or more show very few returns in a range below −15 percent or above +20 percent. No associations with direct investments of more than ten percent of total assets had losses, and only seven of the forty-four with direct investments to total assets between five and ten percent show negative returns.

The relationship between direct investments and the SLA's financial strength was analyzed by regressing the change in net worth on changes in specified assets and liabilities, net worth at the beginning of the period, the size of an association, and a variable measuring changes in exogenous factors. The coefficients reveal that a $100,000 increase in direct investments at the weaker SLAs is associated with an increase in net worth of $14,000 on average. At the stronger SLAs, the average increase is $8,000. An additional regression analysis revealed that changes in direct investments are not significantly associated with changes in other assets and liabilities that the FHLBB has labeled "risky."

Finally, the SLAs that failed were analyzed more extensively to determine if their failures could be ascribed to direct-investments holdings. Individual analyses were conducted of all failed SLAs with over five percent of their assets in direct investments (it should be noted that only nine percent of the failed SLAs fit this category), additional SLAs with net income or loss from direct investments of at least ten percent of net income or loss (both before tax) from other operations, and all SLAs that failed in 1984 and 1985. Direct investments were profitable at about two-thirds to three-quarters of the failed SLAs that had more than trivial amounts of direct investments; at the remainder, direct investments increased their losses from other operations by relatively small amounts, with one possible exception (Eureka Savings and Loan in California).

Thus, direct investments appear to offer a means by which at least some SLAs can increase their earnings without imposing additional risks on the FSLIC. Indeed, because the additional earnings serve to increase equity, the risk to the FSLIC is reduced.

Growth, Return, and Risk (Chapter III)

In March 1985 the FHLBB also adopted a regulation designed to restrict the growth of SLAs. This regulation requires increasing proportions of net worth to total liabilities for quarterly increases in total liabilities ("growth"). Annual growth over twenty-five percent is permitted only with the explicit permission of an SLA's Principal Supervisory Agent. The FHLBB gave as support for this regulation some projections of the growth of SLAs on the assumption that they would grow continuously over four years at rates of growth experienced over 1983-84, a table showing that faster-growing SLAs held higher proportions of assets and liabilities asserted to be "risky," and some narrative accounts of fast-growth SLAs that failed.

Three studies were undertaken. The first examined the rates of growth (percentage change in total liabilities) of SLAs in 1982/81 and 1983/82 compared to 1984/83. A high growth rate over 1984/83 was associated with low prior growth for both small (under $100 million in total assets) and large (over $100 million) SLAs. Only a few had high (over 25 percent annually) rates of growth in successive years.

The second study examined the sources and uses of SLA growth in three years individually—1982/81, 1983/82 and 1984/83. The faster-growing SLAs generally tended to get their funds from jumbo (over $100,000) CDs and from brokered deposits, although this relationship was not found for all three years. About half the growth came from ordinary deposits. Net worth increased statistically significantly more at SLAs that grew faster. With respect to the uses of the funds obtained, the faster-growth SLAs increased their ADC loans at significantly higher rates. Residential mortgages and direct investments also increased at somewhat higher rates, though the relationships were not consistently significant. Thus, the data provide but limited support for the regulation if one believes that brokered deposits and ADC loans are sufficient measures of excessive risk.

The risk of growth to the FSLIC was measured by regressing changes in net worth on changes in total liabilities and assets and liabilities asserted by the FHLBB to be "risky." This analysis finds a positive significant relationship between growth and increases in net worth, and between increases in net worth and increases in unsecured commercial loans, residential mortgages, and direct investments. The relationships predicted by the FHLBB's assumptions were not found. As reported in Chapter I, growth and failures are not statistically significantly related. However, the analysis of individual failures (Chapter I) indicated that very high rates of growth are associated with the failure of some SLAs.

Adjustable-Rate Mortgages and Brokered Deposits (Chapter IV)

The Federal Home Loan Bank Board has permitted and encouraged SLAs making adjustable-rate mortgages as a means of insulating their portfolios from interest-rate risk. Indeed, ARMs may be said to be the cornerstone of the FHLBB's non-restrictive policy actions.

There is some reason (supported by data presented in the chapter) to fear that adjustable-rate mortgages pose greater default risk for holders because of the shifting of interest-rate risk to the mortgagors. Contrary to the positive presumed benefit of ARMs, the financial analysis of failed associations reveals that the proportion of ARMs made by the SLAs that failed in 1985 is indistinguishable from the proportion made by their nonfailed peers. Therefore, it appears that the substitution of ARMs for fixed-rate mortgages (FRMs) may be only partially effective in reducing future SLA failures.

In 1984 the FHLBB attempted to severely constrain brokered deposits by restricting deposit insurance to $100,000 per broker because a number of failures had obtained large amounts of funds through brokers. The proposed regulation was blocked by a court-approved injunction. A study by the Committee on Government Operations (1984B) found that brokered deposits served a beneficial function. The FHLBB was admonished that, rather than bar brokered deposits generally, it should use its existing powers to supervise individual institutions better. The data analyzed in the present study are consistent with the Committee's conclusion and recommendation, although there is some evidence to support the FHLBB's belief that very substantial increases in brokered deposits are associated with failures.

Conclusions and Policy Recommendations (Chapter V)

The data analyzed lead to the conclusions that the FHLBB's regulations restricting direct investments and growth are not supported by evidence and are likely to increase the risk to the FSLIC. These conclusions are supported by the observations of an FSLIC Deputy Director, Liquidations.

Among the recommendations made are the following. (1) Direct investments and other types of assets, liabilities, and activities should not be constrained. SLAs that want to take excessive risks cannot be restrained by such measures, and those that can profit from direct investments and other activities should not be prevented from doing so. (2) Growth, as such, should not be constrained except for proportional capital requirements. (3) Greater amounts of capital, measured in terms of economic rather than regulatory accounting principles (RAP), should be required for all SLAs. (4) Regulatory accounting principles should be withdrawn because they give SLA managers incentives to write loans that provide immediate, though unrealized, increases in income and regulatory net worth. Market-value accounting should be used to the extent feasible. (5) Supervision of individual institutions should be more effective. Some specific suggestions are given in Chapter V.

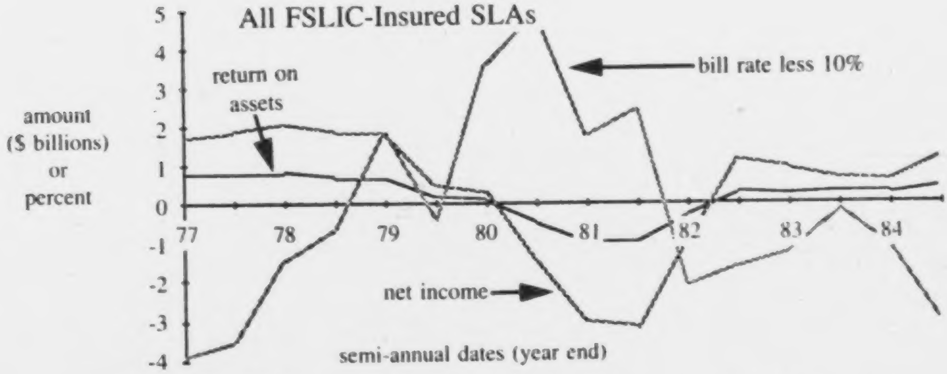
I. An Analysis of Proximate Causes

A. Prelude to the Failures

The 1980s have seen the failure of the largest number of savings and loan associations (SLAs) in U.S. history since the 1930s' Great Depression. This period also is notable for the removal of some regulations on the operations of thrifts and commercial banks. The most important deregulatory actions are the lifting of ceiling rates on time and savings deposits, federal permission for thrifts to offer adjustable interest rate mortgages and consumer and commercial loans, and state permission for thrifts to engage in direct investments—the ownership by an SLA of land held for development, housing and other building projects, and equity in service corporations. The question to be considered is what factors are related to the failures; in particular, have the failures resulted from deregulation?

The financial condition of SLAs began deteriorating in 1979. Chart 1 shows the annualized aggregate net income after taxes of all Federal Savings and Loan Insurance Corporation (FSLIC)-insured associations for semi-annual periods from December 1977 through June 1985.[1] Also shown is the associations' return on assets (net income after tax as a percentage of end-of-period total assets). Aggregate annualized net income fell from a high of $2.05 billion in

CHART 1
Net Income After Taxes
(annualized)
All FSLIC-Insured SLAs



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[1] The numbers are taken from an unpublished compilation by Garcia (1985) of FHLBB semiannual and quarterly financial statements.

December 1978 to a net loss of $3.2 billion in June 1982 (the low point). By June 1985 net income rose to $1.22 billion, 60 percent of the peak amount. (These figures are not adjusted for inflation.) Return on assets similarly went from 0.82% in December 1978 to a negative 0.97% in June 1981, and then to 0.48% in June 1985. The decline in return on assets was not as sharp as the decline in net income because SLAs do not write down reductions in the market value of fixed-interest mortgages and bonds that result from increases in the market rate of interest (a practice that is discussed further below). As shown on Chart 1, the period is marked by a sharp increase in interest rates (proxied by the U.S. Treasury bill rate) that began in 1978 and peaked in 1981.

Higher market rates of interest were particularly damaging to SLAs because they were heavily invested in fixed-interest-rate long-term mortgages that were funded with short-term savings. This unbalanced portfolio was imposed by regulation and supported by tax subsidies, deposit insurance, and custom. The increases in interest rates did not initially affect SLAs' net profits as much as they might have because Regulation Q prevented SLAs and commercial and mutual savings banks from bidding explicitly for depositors' funds in amounts under $100,000. Nonprice competition for funds was attempted in the form of branches and other services.[2] However, money market mutual funds (MMMFs), which were in existence since the early 1970s, and newly developed brokers' cash management accounts offered savers higher interest rates. The MMMFs' assets increased from $3.7 billion at year-end 1977 to $10.8 billion at year-end 1978, $45.2 billion in 1979, $74.5 billion in 1980, $181.9 billion in 1981 and $206.6 billion in 1982.[3] A fairly large portion of these assets came from savings and loan associations, which lost approximately $25 billion in deposits in 1981 and $6 billion in 1982.

The gradual phase-out of ceilings on deposit interest rates permitted by the March 1980 Depository Institutions Deregulation and Monetary Control Act was insufficient to offset the more rapid increases in market rates of interest until these rates began to decline in 1982; therefore, deposits were continually being lost. Moreover, as higher rates of interest paid by SLAs slowly stemmed the outflow of depositors' funds, the associations' expenses increased as a consequence. Furthermore, although the FHLBB allowed SLAs to make adjustable rate mortgages (ARMs) in April 1981, the associations still held large amounts of mortgages that had been written at interest rates below the rates they were paying for funds. The consequence of these several factors is shown in Chart 2. The insured-SLAs' regulatory net worth to total assets began declining from 5.7% in June 1979. The measured decline is least when net worth is measured according to regulatory accounting principles (RAP). This accounting fiction (which is discussed further below) allows SLAs to count as part of net worth certificates (paper issued by the FHLBB to increase recorded, though not economic, net worth), appraised equity capital, and qualifying subordinated debentures, and to defer losses on assets sold that bear below-market interest rates. By December 1982, RAP net worth to total assets declined to 3.7%; the ratio rose to 4.2% by June 1985. Net worth computed according to generally accepted accounting principles (GAAP) declined from 5.8% in June 1979 to 2.9% in December 1984; it rose to 3.2% by June 1985. When goodwill and other intangible assets are excluded, the result is tangible net worth (TAP). By this total assets measure, net worth to assets declined from 5.8% in June 1979 to 0.5% in December 1984, and then rose to 0.7% in June 1985.

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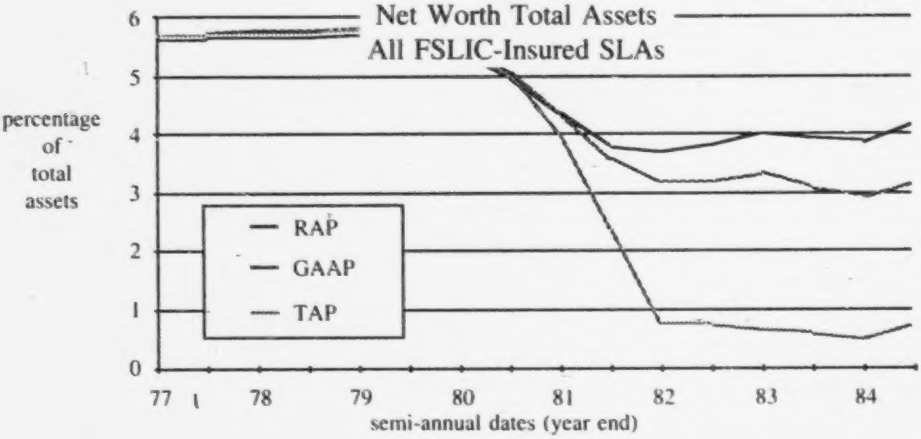
[2] Spellman (1980) found that implicit rate competition cost SLAs about half the increase in net revenues gained from interest rate ceilings. He points out that while "[s]ome techniques, such as advertising and the provision of goods and financial services can be adjusted easily each year . . . , [o]ther capital intensive techniques, such as branching, parking or drive-in facilities cannot be as quickly adjusted if current rate spreads change [,] but once in place become part of the fixed cost structure." (p. 134.)

[3] See Benston (1984B) for an additional analysis of the effects of interest rate ceilings.

CHART 2



It should be noted that none of these metrics shows net worth and assets at their economic market values, which would require restating mortgages and other fixed-interest obligations and other assets and liabilities at their present values. An estimate of economic values is presented by Barth, Brumbaugh, Sauerhaft, and Wang (1985B, Table 3). They restated net worth by adjusting the insured SLAs' investments to current market values using the relationship of their reported net interest earnings to market rates of interest. Estimated market-value net worth as a percentage of total assets is as follows:

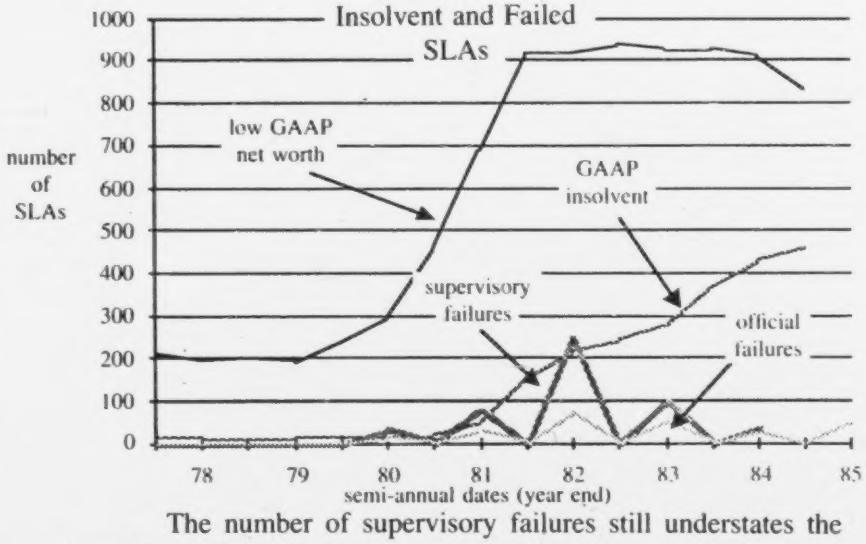
1980	−12.5%
1981	−17.3
1982	−12.0
1983	−5.6
1984	−2.7.

Thus, the aggregate financial condition of the industry has improved as interest rates have declined, but average equity is still negative.

B. The Failure Record

The number of SLA failures and insolvencies from 1978 through 1984 are plotted in Chart 3. "Official" failures are those publicly listed by the FHLBB. These are SLAs which were closed or merged with FSLIC financial assistance. Between January 1, 1980 and December 31, 1984, there were 193 official failures. However, a larger number of SLAs ceased independent operation as a consequence of supervisory action. These are not publicly announced, which prevents people outside the FHLBB from distinguishing these institutions from those that merged for other reasons. The staff of the FHLBB reports that an additional 318 SLAs failed (511 in all).[4] The official and total number of supervisory failures are plotted in Chart 3.

CHART 3


Insolvent and Failed SLAs

The number of supervisory failures still understates the number of SLAs that failed in the sense that they became economically insolvent. Some indication of this understatement is given by the number of SLAs with negative equity according to GAAP. These

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[4] See Barth, Brumbaugh, Sauerhaft and Wang (1985B, Table A-1). They state that "[d]ue to lack of data, failure data include only FSLIC-assisted cases prior to 1980 . . ."

"GAAP insolvent" associations (which, as of the date in question, had not been closed) increased from 14 in December 1977 to 53 in December 1981 and to 461 in June 1985. (See Chart 3.) These 461 GAAP-insolvent SLAs had an aggregate ratio of GAAP net worth to assets of −3.7 percent. Another measure of the extent to which operating SLAs may be economically insolvent is the number with GAAP net worth between zero and three percent. There were 209 such institutions in December 1977 and 241 in June 1980. Thereafter the number rose sharply to 939 in June 1983, and declined somewhat to 833 in June 1985.[5]

C. FHLBB Actions to Deal with the Failures

As the number of failures increased to unprecedented levels, the FHLBB took a number of relatively important regulatory actions.[6] These included (1) accounting changes that increased the institutions' recorded net worth; (2) a reduction in the required amount of net worth relative to assets when an association is subject to special supervision; (3) increases in permitted borrowings from the federal home loan banks; and (4) restraints on insured SLAs' investments and growth. Each is described in turn.

(1) The definition of insolvency was changed with regulatory accounting practices that allowed insured SLAs to increase their equity accounts, as follows, where the adoption dates are given in parentheses:

a. up to 250 basis points of fees on loans (including those made for acquisition, development, and construction—ADC loans) can be taken into income, even though GAAP accounting requires taking fees into income over the life of the loans, with the exception of fees that reimburse currently charged expenses (1979);

b. losses from the sale of assets with below-market yields can be deferred (1981) (GAAP does not permit deferral of realized losses);

c. qualifying mutual capital certificates are issued by the FHLBB to increase recorded net worth (1981);

d. income capital certificates are issued by the FHLBB to increase recorded net worth (1981) (included in GAAP net worth in 1984);

e. net worth certificates are authorized by the Garn-St Germain Depository Institutions Act to increase recorded net worth (October, 1982);

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[5] Number reported in Garcia (1985), Tables 3 and 4.

[6] This narrative is derived from Barth, Brumbaugh, Sauerhaft and Wang (1985B), Table 7, which lists "significant regulatory changes between January 1, 1980 and March 21, 1985."

f. contra-asset accounts, including loans in process, unearned discounts, and deferred fees and credits, are included in net worth (June 1982);

g. appraised equity capital (excess over book value of appraisal value of office land, buildings and improvements, as permitted by the FHLBB) is included in net worth (1982);

h. qualifying subordinated debentures are included in net worth (1982); and

i. equity can be increased by the amount of goodwill and other intangible assets resulting from a merger.

An indication of the relative importance of six of these nine accounting-determined increases in regulatory net worth is shown by the following:[7]

RAP Procedure	Percentage Distribution of Five Procedures 1982	1983	1984
Deferred losses on assets sold (b)	71.8%	63.7%	69.3%
Qualifying mutual capital certificates (c)	1.2	0.3	1.2
Income capital and net worth certificates (d, e)	9.3	14.1	2.1
Appraised equity capital (g)	13.3	17.3	16.0
Qualifying subordinated debentures (h)	4.4	4.6	11.4
Total	100.0	100.0	100.0
Total six procedures as percentage of regulatory net worth	14.3%	13.8%	16.8%

The extent to which the other procedures served to increase regulatory net worth is not known. But it seems clear that these six changes alone, and especially the least justified (in ordinary accounting and economic terms) of these, deferring realized losses on assets sold, permitted the FHLBB to maintain the fiction that many SLAs were and are not insolvent.

(2) The minimum net worth requirement defines the point at which the FHLBB may exercise substantially increased authority over and responsibility for the operations of SLAs. In 1980, this requirement was lowered from five to four percent of regulatory net worth, and then to three percent in 1982. Had the five percent standard been maintained, the FHLBB would have had to extend increased

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[7] Source: Barth, Brumbaugh, Sauerhaft, and Wang (1985A), Tables A-6 and A-7. Also see Auerbach and McCall (1985) for similar estimates covering 1979 through 1983.

supervision to some 962 additional SLAs at year-end 1983 (with 44% of the industries' assets), and 800 additional at year-end 1984 (with 35% of the assets).[8]

(3) In 1980 FSLIC members were permitted to borrow from federal home loan banks up to 50 percent of assets rather than 50 percent of saving deposit balances. The statutory reserve requirement was reduced from five to four percent of insured accounts in 1980 and to three percent in 1982. In 1983 federal home loan banks were permitted to make advances to FSLIC-insured institutions without customary credit evaluations, and to make advances for terms up to 20 years rather than the previous 10 year maximum. These changes relieved insured SLAs of liquidity problems, which further helped the FHLBB keep insolvent associations open.

(4) Restrictions on SLAs' activities were both decreased and increased by the FHLBB, as follows:

a. Interest rate risk: In April 1981 the FHLBB authorized the granting of adjustable rate mortgages. Indeed, emphasis on these mortgages and a July 1984 requirement that insured institutions establish policies for interest rate risk management are the FHLBB's principal reactions to the failures caused by increases in interest rates.

b. Brokered deposits: In January 1984 the FHLBB attempted to deny FSLIC insurance to broker-originated deposits in a rule announced jointly with the Federal Deposit Insurance Corporation (FDIC). Before the rule could take effect the Federal District Court in Washington, D.C. declared that the agencies had exceeded their statuatory authority. However, the FHLBB monitors brokered deposits by requiring insured SLAs to report the amount of brokered deposits obtained and the interest rates paid.

c. Direct investments: Over several years, several states removed or reduced constraints on the activities permitted by state-chartered SLAs. Maine first allowed direct investments in 1975. Most notably, Florida expanded their thrifts' investment powers in 1980, followed in 1982 by Texas. California eliminated most specified asset restrictions in January 1983 (subject to specific supervision by the state authorities). Florida and Texas also liberalized their laws in 1983. However, as of May 1985, only the states of California, Nebraska, and Wisconsin imposed no dollar limitations on direct investments in real estate and equity in service corporations.

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[8] Derived from Barth, Brumbaugh, Sauerhaft and Wang (1985B), Table 2.

In March 1985, the FHLBB limited direct investments to ten percent of an insured institution's assets or twice its equity, absent specific approval by the FHLBB's supervisory agent. In conjunction with the constraint, the FHLBB defined direct investments to include some very low-borrower-equity and profit-sharing loans, particularly loans made for property acquisition, development, and construction (ADC loans).

d. Growth: In March 1985 the FHLBB imposed proportionately higher capital requirements for SLAs that increase their total assets at rates greater than 15 percent a year, measured quarterly. This regulation also imposed an additional capital requirement of ten percent of direct investments.

The justification and effect of these regulations is analyzed in Chapters II, III, and IV of this monograph. I turn now to the study of SLA failures.

D. The Definition of a Failure— Biases in the Data Used for the Study

As shown above, many SLAs are still allowed to operate although they are economically insolvent. Two factors allow this situation to occur. One is federal deposit insurance. Depositors need not be concerned with the solvency of their institutions as long as they believe that their funds will be repaid when promised. Although the assets held by the FSLIC may not be sufficient should many insolvent institutions be closed (as is shown next), the public evidently believes that the Congress will not permit the insurance fund to go bankrupt.[9]

The second is the unwillingness of the chartering agency to close an insolvent institution. As long as an institution is not illiquid (which is unlikely to occur as long as it has deposit insurance and as long as the federal home loan banks are willing to lend it funds), it can continue to operate. The only constraint is the reduction of its regulatory equity below zero. Even this is not a binding constraint, since the FHLBB has permitted several "phoenix" associations to operate even though they have negative equity.

Furthermore, as discussed above, the FHLBB has adopted regulatory accounting practices that allow SLAs to report equity as positive which would be negative under ordinary (GAAP) accounting methods. In fact, a significant determinant of the number of failures is the amount of the FSLIC fund relative to the total assets of operating SLAs—the lower the ratio, the lower the probability that failures will occur.[10]

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[9] The Joint Concurrent Resolution passed by the Congress in March 1982 put the "full faith and credit" of the U.S. government behind the federal deposit insurance funds. The resolution was nonbinding and has expired.

Consequently, the "official" failures are a biased sample of insolvent SLAs. RAP accounting tends to exclude from the sample some associations that have become insolvent because of increases in interest rates. These SLAs do not have to reduce the book value of their fixed-interest long-term mortgages and bonds to their current market values. They also do not have to reduce equity by the amount of loss realized when such obligations are sold. Thus they can continue to operate until they "bleed to death" as a result of expenses exceeding income over several years.

However, RAP (and GAAP) accounting requires a reduction in asset book values and equity resulting from credit losses and declines in the market value of direct investments. Potential loan defaults must be accounted for with a debit (charge) to bad debts expense and a credit to an allowance for losses. Actual defaults reduce the allowance, giving rise to a further charge to expense, and hence a reduction of equity. Direct investments must be written down to market values at each year-end. Losses incurred from the operation of direct investments are recorded as they occur and are accrued. Capital gains, though, are not recorded until they are realized. Hence, associations that incurred asset-quality losses tend to be fully included in the official failures, while those that incurred losses from interest rate increases are underrepresented. The only exceptions to this generalization are fraudulently run institutions that report false financial data and that have not yet failed.

E. Method of Analysis

All 202 SLAs that officially failed between January 1, 1981 and August 31, 1985 (the latest date for which data were available) were included in the analysis.[11] These SLAs include eleven that had not been publicly listed by the FSLIC as failures, but which were announced as such to the press.[12] These SLAs nevertheless were included because they were said by the FHLBB to represent asset-quality rather than interest-rate problems.

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[10] See Barth, Bisenius, Brumbaugh, and Sauerhaft (1985).

[11] Twenty-seven additional official failures are listed on the FHLBB's lists of 1985 failures (three insurance of accounts, ten FSLIC-assisted acquisitions and mergers, and fourteen management assignment programs). These failures were not known to the author until January 1986. Among the twenty-seven are eight listed as failing before August 31 (three insurance of accounts, one FSLIC-assisted acquisitions and mergers, and four management assignment program).

[12] These associations are: Eureka, San Carlos CA; Beverly Hills, Beverly Hills, CA; Southern California, Beverly Hills, CA; Citizens, Batesville MS; Central, San Diego CA; Sunrise, Lake Worth, CA; Bell, San Mateo, CA; Bell, Belton TX; Butterfield, Temecula CA; Centennial, Guerneville, CA; and Presidio, Porterville, CA.. All except Citizens were placed in the FHLBB's Management Consignment Program, which allows the associations to continue operations under the management of other associations per a contract with the FHLBB.

The 202 failures were studied to determine the variables associated with their failure. The failed SLAs were studied in four ways. First, the financial ratios of the failures were compared individually with the same ratios of the nonfailed peer associations by year. Ratios of the failed SLAs less those of their nonfailed peers in states that liberalized their laws with respect to SLAs' investments and that experienced the largest number of failures were examined additionally. Each of these states, which include California, Texas, Florida, Ohio, and Louisiana, had between 11 and 15 failures.[13]

The second analysis involves examining all of the ratios together to determine how each is related to failure when the effect of the other ratios is considered. A logistic multiple regression model was used for this purpose with national data and the data from the five states. A test of the model and of the stability of the factors related to failure was made by estimating the parameters of the model with U.S. data from 1982 and 1983, and using these to predict failures in 1984 and 1985.

The third analysis relates the payouts by the FSLIC to the financial ratios of the 95 failed associations for which these data are available. An ordinary least squares multiple regression model was used for this study.

Fourth, the financial statements for up to four years prior to failure of twenty-one individual failed SLAs were studied in detail. Such an examination is desirable because statistical analysis can mask important relationships by averaging out effects, or the variables used or the way they are used may misspecify the relationships and/or time patterns. The particular institutions analyzed are those that had direct investments to total assets of more than five percent in the year prior to failure. Thus, this analysis examines more closely the effect of these investments on failure.

F. The Model and Variables

The determinants of failures (F) can be modeled as follows:

(1) F = f(EQ, FP, MG, EX),
where
F = failure,
EQ = equity, or financial strength,

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[13] Arizona, California, Florida, Ohio, and Texas are the only states specifically mentioned by the FHLBB in its supporting preamble to a final rule (enacted in March 1985) limiting direct investments, as having "significantly expanded the investment powers of institutions which they charter." (FHLBB, January 1985), p. 6912. Arizona had no failures. Louisiana was included because it has a relatively liberal law and 15 failures. The only other states with comparable number of failures are New York with 15 and Missouri with 9. Maine and Nebraska, which have liberal direct investments laws, had no failures. Mississippi, also with a liberal law, had six failures.

FP = financial performance,
MG = management,
EX = exogenous factors.

All variables are assumed to be measured in terms of economic market values.

The role of EQ is obviously important—if it is measured in terms of economic market values, it defines the extent to which the firm's net assets can decline before it is insolvent. Measured according to RAP accounting, it defines when the authorities are likely to close the institution. FP plays a similar role, since the result of good or bad financial performance is an increase or decrease in equity. But the variable also reflects measures of the financial structure of the firm and its operations, which, in turn, affect fluctuations in the net cash flows from the firm's operations, the principal determinant of risk.

The effect of MG generally is impounded into FP, because managers tend to be rewarded according to their marginal value product, as are other input factors. However, opportunistic and risk-preferring managers and owners could cause the failure of the firm by deliberately taking risks. When the full cost of failure is not borne by the managers or owners, risk taking can result in the total firm's expected value being negative. This can be the situation for insured depository institutions more than for other firms because deposit insurance is not priced to take the cost of risk fully into account.

Exogenous factors or shocks (EX) that result in firms' experiencing negative net cash flows obviously cause failures.[14] EX also includes the effect of government regulations, that, until recently, prohibited SLAs from diversifying their operations and balance sheets by offering checking accounts or other than real estate-related loans, while subsidizing them to hold interest-rate controlled savings deposits and fixed-rate mortgage loans. Because the effects of EX are mitigated or enhanced by the way a firm has structured its operations and finances, these effects are captured partly by the other variables, but may differ in intensity over time.

The four general determinants of failure can be specified in terms of the balance sheet and operations of the firm, which reflect the impact of the determinants. If these numbers are reasonably good measures of economic market values, failure should be positively related to lower equity, lower profits, and less diversified operations, *cet. par.*. The holding of a greater proportion of riskier assets and liabilities need not be positively related to failure, because the outcome could be increases in profits and equity.

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[14] Carron (1982) and similar papers only consider increases in interest rates in the late 1970s and early 1980s and the unbalanced nature of SLA assets and liabilities. Carron concludes that these were the principal cause of the SLAs' problems. In his section entitled "The Causes of Distress," he discusses only the effects of general market conditions on SLA operations, and makes some suggestions for ameliorative change.

Altman (1977 and 1983) published the first and (at the time this study was undertaken, the only) analysis of which I am aware of individual SLA failures or potential failures.[15] During the period studied, 1966 to 1973, there were few failures, so he analyzed 56 "serious problem" and 49 "temporary problem" SLAs and a control sample of 107 "no problem" SLAs. In his 1983 book, which provides a fuller description of the model and a report of the coefficients estimated, he states (p. 293):

> We examined 32 financial ratios [measured over seven semiannual periods prior to a SLA becoming a "problem"] as potentially helpful contributors to our discriminant functions, the one-period [six-month] and the two-period trends of a number [24] of these ratios, and the group mean comparisons of these variables. These variables are selected based on a careful analysis of the industry and discussion with regulatory personnel.

He reports (p. 294): "[a]fter scores of runs and tests, the following 12-variable model emerged," which is paraphased as follows:

> Eight ratios at the end of the six-month period prior to problem status, as follows:
>
> net operating income/gross operating income,
> net worth/total assets,
> real estate owned/total savings,
> borrowed money/total savings,
> earned surplus/total assets,
> total loans/total savings,
> FHLB advances/net worth, and
> foreclosed real estate owned/total assets.
>
> Plus changes over the year prior to problem status for the first four variables.

The variables used for the present analysis are based on the hypotheses about SLA failures discussed above, Altman's findings, the numbers now recorded in the financial statements SLAs filed with the FHLBB and made public by the agency, and the numbers structured by Cates Consulting Analysts, from whom the data were obtained.[16] The numbers that specify the model (described next) were transformed to percentages of assets and liabilities to control for the effect of size and to express the variables in a form that has operational meaning for comparisons among SLAs. Variables 10 through 16 and 19 through 21 speak directly to hypotheses of regulatory concern.

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[15] After the present univariate study was specified, the data through June 1984 were analyzed, and a preliminary version prepared and presented to the U.S. House of Representatives Committee on Government Operations in February, 1985 (Benston, 1985B), a similar analysis by Barth, Brumbaugh, Sauerhaft, and Wang (1985A) of official and unofficial (supervisory) failures in 1982 and 1983 was presented at the Conference on Bank Structure and Competition at the Federal Reserve Bank of Chicago, in May 1985. That study is reviewed and compared to the present analysis below. That paper includes a useful compilation (Table 5) of Altman's study and four studies of commercial bank failures and presents the first multinomial logit study of failures and OLS regression study of cost to the FSLIC of failures. Another valuable description of models applied to commercial banking may be found in Bovenzi, et. al (1983) and Sinkey (1979), as well as in Altman (1983). These papers include references to other works. FDIC (1983, Appendix B) also includes a twenty item bibliography and brief critical descriptions of the research.

EQ (equity or financial strength)

1. NWTA = net worth to total assets: net worth does not include net worth certificates.

FP, MG, and EX (financial performance, management performance, and exogenous factors)

(EX also is taken into account by annual analysis of the data as a means of determining the effect of temporal changes on the determinants of failure.)

2. RETTA = return on total assets: net income after taxes divided by total assets as an overall measure of profits or financial performance.
3. NIMEA = net interest margin on earning assets: interest and fee income less interest (including interest "dividends" to depositors) divided by earning assets (loans and investment securities), which measures the combined effect of financial structure, managerial risk taking in terms of assuming interest rate risk, and government regulations that enforced or encouraged SLAs to hold assets and liabilities such that the net duration of their portfolios was positive.

Interest margin can be disaggregated into:

4. YLDEA = yield on earning assets: interest and fee income divided by earning assets; higher levels could indicate more effective management, more risk taking (efficient or reckless) by management, and/or the effect of exogenous factors. Variables 11 through 14 provide more specific measures.
5. FEELR = fees on loans to total loan revenue: fee income divided by total loan revenue; RAP accounting permits SLAs to record unearned fees as income; this variable could reflect opportunistic managerial behavior.
6. COSTFD = cost of funds: interest and depositors' dividends

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[16] As noted in the following section, use of Cates' data yielded some important measurement advantages.

divided by earning assets, which is specified more precisely by variables 7 through 10.

7. LLEA = large liabilities to earning assets: jumbo certificates of deposit (CDs), generally $1 million and above, plus FHLB advances plus short-term debt divided by earning assets provides a measure of funds not obtained from core, generally local, depositors.
8. JCDEA = jumbo CDs to earning assets: this variable indicates investors' perceptions of the risks taken by an SLA because only the first $100,000 of jumbo CDs are insured by the FSLIC.
9. FHLBAEA = federal home loan bank advances to earning assets: this variable measures the willingness of the federal home loan banks and SLA managers to take risks.
10. BRKDEA = brokered deposits to earning assets: because these deposits generally are FSLIC insured, this variable measures the propensity of managers to take risks and speaks to the FHLBB's concern about this source of funds.

Loan quality, and hence managerial risk taking, is measured by the following variables:

11. FORECLTL = foreclosed loans to foreclosed plus outstanding loans: this variable provides a measure of past managerial decisions and of exogenous factors; because foreclosures include only mortgage loans, it also speaks to the hypothesis that newer investments rather than traditional mortgages are causal factors of the failures.
12. NRMTL = nonresidential mortgages to total loans: nonresidential mortgages include loans made for the acquisition and development of real estate (the AD portion of ADC loans—construction loans are not given separately), and loans made on commercial real estate; the FHLBB refers to these loans as being particularly risky.
13. NMCLTL = nonmortgage commercial loans to total loans: commercial loans were not permitted to most SLAs prior to 1981; this variable provides a measure of the effect of this aspect of deregulation.
14. CLOANTL = consumer loans to total loans: most SLAs were permitted to make only real-estate-related consumer loans before 1981; as with NMCLTL, this variable measures the effect of an aspect of deregulation.
15. DITA = direct investments to total assets: direct investments is equity shares in service corporation subsidiaries and real estate

held for investment and development, divided by total assets. These are the only assets that have been restricted by the FHLBB; hence, this variable is of particular policy interest. It should be noted that direct investments, as used in this study and in the studies that the FHLBB cited to justify its restrictive rule, do not include equity participation, joint venture, and low-borrower equity commercial real estate loans, unless these were classified as "direct investments" on the financial reports filed with the FHLBB. The FHLBB has not required SLAs to report separately loans that it presently wants classified as direct investments. Consequently, these data are not available, to my knowledge.[17]

Growth, which is related to financial performance, managerial risk taking, and the second of two major regulatory actions by the FHLBB, is measured by:

16. PCTA = percentage change in total assets.

Changes in other variables also should be taken into account. The following variables are measured as the change in the ratio levels in successive years:

17. LLEAC = change in LLEA (large liabilities to earning assets).
18. JCDEAC = change in JCDEA (jumbo CDs to earning assets).
19. BRKDEAC = change in BRKDEA (brokered deposits to earning assets).
20. NRMTLC = change in NRMTL (nonresidential mortgages to total loans).
21. DITAC = change in DITA (direct investments to total assets).

G. Data—Sources, Measurement, and Shortcomings

The variables are measured with financial statement data reported semiannually to the FHLBB. The assets and liabilities are means of three numbers—the balances at the beginning, middle, and end of calendar years.[18] This averaging procedure reduces the amount of noise in the data that would result from using only year-end figures. The income and expenses are annual amounts.

The financial numbers are those from the calendar year before the year in which an SLA failed, and the year prior to that. The prior periods were used so that the findings would have some predictive content. However, it should be noted that there is a variable gap between the financial data and the time of failure.

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[17] This issue is discussed further in Chapter II.

[18] The data were put into machine readable form and the initial calculations were made by Cates Consulting Analysts, Inc.

The nonfailed peer associations were chosen from the universe of associations operating at year end on the basis of two criteria. One is control of differences due to the location and size of institutions. The other is independence among observations, such that each failed SLA would be matched with *its* relevant set of peers. The following specific procedures were followed. First, SLAs with net worth certificates were excluded as peers, because these are associations that the FHLBB recognizes as insolvent or close to insolvent. Second, the SLAs were grouped into five regions: atlantic, southern, southwest, midwest, and pacific.[19] Third, the two next largest and two next smallest nonfailed SLAs, as measured by average assets in the year prior to failure, were chosen as peers, with replacement. Thus, a nonfailed SLA could be a peer for more than one failure. Though this method of selecting peers dampens the effect of regional variations (which generally is desirable), the separate analyses of failures in California, Texas, Florida, Ohio, and Louisiana should permit regional comparisons.

Many of the numbers are generally good representations of economic market values. The liabilities (variables 7, 8, 9, and 10) are predominantly short-term, and hence are repriced at the market. Similarly, interest expenses (included in variable 3) represent the cost of funds, although, they are understatements in the first part of the period when Regulation Q ceilings were below market rates. The recorded asset amounts for nonresidential mortgages, nonmortgage commercial loans, and consumer loans (variables 12, 13, 14) are relatively short-term and close to market values. Direct investments (variable 15) are understated to the extent that there are unrealized capital gains on these assets, while capital losses are supposed to be recorded, whether or not realized.

Net worth, earning assets, net income after taxes, and net interest margin are likely to be overstated because capital losses on fixed-interest obligations (particularly mortgages and bonds) are not recorded until realized, and RAP accounting permits realized losses on sales of below-market-rate obligations to be deferred. Consequently, net worth to total assets (variable 1) is likely to be overstated. The direction of the biases in return on total assets, net interest margin, and yield on earning assets (variables 2, 3 and 4) is not clear, because both the numerators and denominators tend to be understated. However, the failures' numbers are analyzed relative to a control group of peer nonfailed SLAs, whose numbers are likely to be similarly biased. Therefore, assuming that the SLAs reported their financial conditions honestly, the numbers should provide meaningful tests of the hypotheses.

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[19] *Atlantic* includes: Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.
Southern includes: Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, Puerto Rico, and Virgin Islands.
Southwest includes: Colorado, New Mexico, Oklahoma, and Texas.
Midwest includes: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming.
Pacific includes: Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington.

H. Univariate Analysis—Comparison of Individual Financial Ratios

U.S. Failures

The one-by-one comparison of financial ratios of the 202 failures and a control sample of 808 nonfailed peers, given as means of ratios expressed in percentages, is presented in Table 1. The data are given for each year, 1981 through 1985, and the total of the five years. The years refer to the year of failure; the data come from the year prior to failure. Review of the annual data allows an assessment to be made about exogenous changes that may have occurred over the time period studied.[20]

The findings are discussed in the following order. (a) The measures of financial strength and overall performance, NWTA, RETTA, and NIMEA, are considered. These variables show more the likelihood that an SLA will be forced to close or merge (fail) than the reasons associated with its having failed. (b) The reasons for the negative NIMEA are explored by examining its components—YLDEA, FEELR, and COSTFD. (c) Because COSTFD is the only one of the three that is significantly higher at the failed SLAs, the liabilities that determine it—LLEA, JCDEA, FHLBAEA, AND BRKDEA—are reviewed. (d) The measures of loan and other asset quality—FCLMTL, NRMTL, NMCTL, CLOANTL, and DITA—are discussed. (e) The variable that speaks to the regulatory issue about growth—PCTA—and changes in specific liabilities and assets—LLEAC, JCDEAC, BRKDEAC, NRMTLC, AND DITAC—are considered. The change variables also are reviewed as a means of determining the extent to which data from two years before failure are relevant.

Also discussed are the findings by Barth, Brumbaugh,

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[20] The data were examined for normality. Five observations (SLAs) had ratios that clearly were outliers—one in 1982, three in 1984 and one in 1985. The numbers presented in Table 1 include these observations. The ratios also were calculated with all five outliers omitted. (The ratios with only the outlier values excluded were not computed to avoid the possibility that a high value of one ratio might be offset by a low value of another.) Where the significance of the differences is changed when the outliers and their peers are excluded, the ratios without the outliers are given in the text.

TABLE 1

Analysis of Failed Savings and Loan Associations, January 1, 1981-August 31, 1985
Means of Financial Ratios in the Year Prior to Failure
(in percentages)

Year of Failure	1981-85	1985	1984	1983	1982	1981
Number of associations	202	22	27	53	72	28
1. Net Worth to Total Assets (NWTA)						
Failed SLAs	– 0.9	– 1.5	– 6.1	– 1.2**	0.7	1.1
Peer SLAs	4.7	4.4	4.1	4.5	4.9	5.6
Difference	– 5.6**	– 5.9**	–10.2**	– 5.7**	– 4.2**	– 4.5**
St. Dev. of Mean Diff.	0.5	1.3	2.9	0.3	0.3	0.6
2. Return on Assets (RETTA)						
Failed SLAs	– 2.5**	– 2.4**	– 3.8**	– 3.1**	– 2.3**	– 1.2**
Peer SLAs	– 0.3	0.3	0.2	– 0.7	– 0.7	0.1
Difference	– 2.2**	– 2.7**	– 4.0**	– 2.4**	– 1.6**	– 1.3**
St. Dev. of Mean Diff.	0.2	0.9	1.1	0.2	0.2	0.3
3. Net Interest Margin on Earning Assets (NIMEA)						
Failed SLAs	– 1.1**	0.1	– 0.4	– 1.8**	– 1.7**	0.0
Peer SLAs	0.8	1.6	1.6	0.1	0.3	1.4
Difference	– 1.9**	– 1.7**	– 2.0**	– 1.9**	– 2.0**	– 1.4**
St. Dev. of Mean Diff.	0.2	– 0.5	0.6	0.2	0.5	0.2

4. Yield (Interest Income) on Earning Assets (YLDEA)						
Failed SLAs	10.9**	13.3**	11.3**	10.8**	10.6**	9.7**
Peer SLAs	11.0	12.5	11.8	11.2	10.8	9.7
Difference	– 0.1	0.8	– 0.5	– 0.4	– 0.2	0.0
St. Dev. of Mean Diff.	0.1	0.6	0.6	0.2	0.2	0.2
5. Fees to Total Loan Revenue (FEELR)						
Failed SLAs	4.5**	6.1**	7.0**	2.9**	4.1**	5.1**
Peer SLAs	3.5	6.3	4.8	2.6	3.0	3.2
Difference	1.0**	– 0.2	2.2	0.3	1.1*	1.9
St. Dev. of Mean Diff.	0.3	0.6	1.3	0.3	0.6	1.0
6. Cost of Funds (COSTFD)						
Failed SLAs	11.1**	11.1**	10.1**	11.7**	11.7**	9.4**
Peer SLAs	10.3	10.0	9.7	11.0	10.6	8.6
Difference	0.8**	1.1*	0.4*	0.7**	1.1*	0.8**
St. Dev. of Mean Diff.	0.2	0.5	0.2	0.1	0.5	0.1
7. Large Liabilities to Earning Assets (LLEA)						
Failed SLAs	33.1**	50.6**	41.5**	27.2**	29.2**	32.7**
Peer SLAs	13.5	24.3	15.4	11.5	12.3	10.2
Difference	19.6**	26.3**	26.1**	15.7**	16.9**	22.5**
St. Dev. of Mean Diff.	1.4	5.1	5.4	2.2	2.1	3.4

(continued)

TABLE 1 (Continued)

Analysis of Failed Savings and Loan Associations, January 1, 1981-August 31, 1985
Means of Financial Ratios in the Year Prior to Failure
(in percentages)

Year of Failure Number of associations	1981-85 202	1985 22	1984 27	1983 53	1982 72	1981 28
8. Jumbo CDs to Earning Assets (JCDEA)						
Failed SLAs	16.6**	32.9**	27.3**	11.2**	12.4**	14.2**
Peer SLAs	6.0	13.4	8.5	5.5	4.9	3.2
Difference	10.6**	19.5**	18.8**	6.7**	7.5**	11.0**
St. Dev. of Mean Diff.	1.3	4.5	5.8	1.9	1.6	2.7
9. FHLB Advances to Earning Assets (FHLBAEA)						
Failed SLAs	12.7**	14.0**	12.4**	13.4**	12.2**	11.6**
Peer SLAs	5.5	6.5	4.6	5.1	5.8	5.5
Difference	7.2**	7.5**	7.8**	8.3**	6.4**	6.1**
St. Dev. of Mean Diff.	0.7	3.2	2.2	1.5	1.0	1.2
10. Brokered Deposits to Earning Assets (BRKDEA)						
Failed SLAs	4.9**	19.8**	17.5**	0.7	0.6	—
Peer SLAs	1.2	7.4	2.1	0.4	0.0	—
Difference	3.7**	12.4*	15.4*	0.3	0.6	—
St. Dev. of Mean Diff.	1.1	5.4	6.1	0.4	0.3	—

Sauerhaft and Wang (1985A) (hereafter BBSW) derived from a similar analysis of a larger number of "failures." These 318 "failures" over the years 1982 and 1983 include 225 FSLIC-assisted mergers that were not publicly announced as official failures and hence are not included in the present study. BBSW compared these failures to 588 nonfailed SLAs chosen randomly. They calculated the financial ratios at the time of failure, six months before failure, and one year before failure.[21]

(a) Financial Strength and Overall Performance

1. *Net worth to total assets (NWTA)* of the failed associations is significantly negative only for the 1983 failures. Indeed, the following percentages of SLAs with positive net worth (excluding net worth certificates) in the year before failure are found for each of the failure years, beginning with 1981: 93%, 85%, 23%, 26%, and 32%. Thus, prior negative net worth is not a necessary condition for failure.

However, compared to those of their peers, the failed SLAs' net worth ratios are significantly (.01 level) lower in each of the years; for the entire period, the difference (in percentage points) averages −5.6%. These negative numbers are inflated by outliers among the 1985 failures of −17.2%, and in 1984 of −26.7% and −77.4%;[22] the 1984 ratio is further biased by a 3.6% positive value.[23] With the outliers excluded, the mean NWTA for the failed SLAs is −.03% overall, −.07% in 1985 and −2.6% (significant at the .01 level) in 1984. The difference still is significantly negative, though the numbers are smaller (−5.1% overall, −5.1% in 1985, and −6.8% in 1984). Almost none of the failures less peers NWTA ratios are positive. (BBSW report similar numbers. The mean of this ratio at the time of failure, six months before, and one year before are −4.4%, −3.5% and −3.1%, all significantly different from zero.)

2. *Return on total assets (RETTA)* of the failed SLAs and the failures less the ratios for their peers is significantly negative for all failure years. The difference averages −2.2%. With the outliers of −16.4%, −20.2%, −23.9% (and 1.2% and 0.0% for the two other excluded observations) omitted, the mean differences still are signifi-

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[21] In addition to seven variables that are comparable to the ones used in the present study, BBSW included the following five variables: total slow loans and scheduled items/total assets, total slow loans and scheduled items plus past due investments/total assets, total expenses/total revenue, cash plus investment securities/total assets, and the logarithm of total assets. The first two variables (scheduled items) were not publicly available until 1985. All except logarithm total assets are statistically significant. The first three, which measure the relative level of expenses, are higher at the failed SLAs than at their peers. The fourth variable indicates that liquidity at the failed SLAs is lower than at nonfailed peers.

[22] The 1985 outlier is Citizens of Batesville, MS, a $25 million association. The 1984 outliers are New North Mississippi of Oxford, MS, a $115 million association that was restructured after having had severe financial difficulties in the previous year, and American of Biloxi, MS., a $9 million association.

[23] Empire of Mesquite, TX. The 1982 outlier has only two extreme ratios—COSTFD and PCTA.

cantly negative, but they decrease to −2.0% for the overall sample, −2.0% for 1985, and −2.8% for 1984.[24] (BBSW use a similar variable and report similarly significantly negative mean differences of −1.0%, −0.6%, and −0.6% at the time of failure, six months before, and one year before.)

3. *Net interest margin (NIMEA)* at the failed associations is negative for all failure years (significantly so in 1983 and 1982). Compared to the nonfailed peers, NIMEA is significantly negative (.01 level) for all years by an average of −1.9%. Few of the failed associations experienced positive margins. The mean overall value is close to the −2.2% average for RETTA (−1.7% compared to −2.0% when the outliers are omitted.) Thus, it appears that negative interest margins are the primary reason for the lower earnings of the failed SLAs. (BBSW do not use this variable.)

(b) Reasons for the Negative Interest Margins

4. *Yield on earning assets (YLDEA)* was specified as a measure of risk taking by SLA managers, effective management, and exogenous factors. It is examined to determine whether the reason for the negative interest margin was an income deficiency. The data indicate small and insignificant differences between the failed SLAs and their peers in all years. This finding is consistent with the hypothesis that the managers of the failed institutions did not take excessive asset risks, *cet. par.* (at least as measured by asset yields in the year prior to failure). It is possible that they took such risks in prior periods. Therefore, an assessment of the hypothesis must await review of the data on loan chargeoffs and asset writedowns. (BBSW do not use this variable.)

5. *Fees to total loan revenue (FEELR)* is higher at the failed associations than at their peers for all failure years except 1985, but is significantly higher only at the 1982 failures and over all years. This finding provides only weak support for the hypothesis that the failed SLAs tended to record high upfront fees in the year prior to failure.[25] (BBSW do not use this variable.)

6. *Cost of funds (COSTFD)* is significantly higher at the failed SLAs in all years, averaging 0.8% more than that of their peers overall.[26] Higher funds cost explains about thirty-five to forty percent

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[24] The numbers for the omitted SLAs are given in the same order as listed in the previous footnote, unless otherwise indicated. Changes in the ratios not mentioned are small in magnitude and statistically insignificant.

[25] Fees were not significantly different two years before failure. Excluding Empire of Mesquite, TX (which reported fee income equaling 25% of total revenue in the year prior to failure) hardly changes the numbers.

[26] One 1982 failure, First Financial of Downers Grove, IL, reported a 41.8% cost of funds. Excluding it and the other four outliers reduces the failed SLAs' mean COSTFD for 1982 to 11.3 and the difference to 0.6, but has almost no effect on the other numbers.

of the lower return on assets reported by the failed SLAs compared to their peers. (BBSW find significantly higher cost of advances to total loans at the failed SLAs of about 0.3%.)

(c) Analysis of Liabilities

7. *Large liabilities to earning assets (LLEA)* averages 33.1% at the failed SLAs. The ratios are significantly higher at the failed SLAs compared to their nonfailed peers in all years, averaging 19.6% more. A further analysis is made by examining the principal components of large liabilities. (BBSW report a significant mean difference between the failures and their peers of 3.4% for "interest-sensitive funds to total funds" in all three periods at and prior to failure.)

8. *Jumbo CDs to earning assets (JCDEA)* average 16.6% at the failed SLAs and is significantly higher at the failed SLAs compared to the peers for all years, averaging 10.6% more. Because this liability is largely not insured by the FSLIC, higher levels of this variable indicate that investors did not believe that the SLAs would fail or were confident that they either could remove their funds before failure or were *de facto* insured. It also is interesting to note that, while the relative dollar amount of jumbo CDs increased at the 1984 and 1985 failures over the amounts at the previous years' failures at both groups of SLAs, the increase was greater for the failed SLAs. (BBSW find that jumbo CDs to total loans is significantly higher at their sample of failed SLAs compared to peers by 1.9%, though the number is not significant at the time of failure.)

9. *FHLB advances to earning assets (FHLBAEA)* averages 12.7% at the failed SLAs. It also is significantly higher at the failed SLAs than at their peers by 7.2% on the average. Thus it appears that the federal home loan banks were also willing to take risks (perhaps in the hope of forestalling failure) or were unable to determine the risk of lending to many of these institutions, and thus did not refuse the SLAs' requests for funds. (BBSW do not use this variable.)

10. *Brokered deposits to earning assets (BRKDEA)* is 17.5% at the 1984 failed SLAs and 19.8% at the 1985 failures, but is quite small in earlier years. (The data were not reported in 1981). The difference in the ratios of the failed SLAs less their peers averages 15.4% and 12.4% for the 1984 and 1985 failures; both differences are statistically significant. With the outliers removed, the 1984 mean ratio is 10.6% and the difference 8.9% (both significant at the .01 level).[27] (BBSW do not use this variable.)

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[27] BRKDEA is 21.4, 35.6, and 121.2 at New North Mississippi, Empire, and American.

Summary: Cost of Funds

In sum, the higher cost of funds incurred by the failed SLAs appears due to several factors. From these data alone one cannot determine whether these higher interest costs were incurred to obtain funds for investing in risky assets or to replace funds withdrawn from low-yielding deposit accounts, or both.

(d) Loan and Other Asset Quality

11. *Foreclosed mortgages to foreclosed plus outstanding loans (FCLMTL)* is significantly greater than zero at the failed SLAs in all years, averaging 1.5% overall. The rate at the peer associations is not significantly greater than zero in any year. The difference averages 1.1% and is significant. The foreclosure rate also is substantially higher at failed over nonfailed SLAs for 1985 and 1984. Thus, it appears that defaulted mortgages are related to failure. The data do not permit distinguishing between mortgages made to homeowners or on commercial properties. (BBSW get similar results, although the magnitudes are much smaller. They report ratios of .05%, .13%, and .06% for the time of failure, six months prior, and one year prior; only the latter two are significant.)

12. *Nonresidential mortgages to total loans (NRMTL)* over the period averages 16.2% at the failed institutions and 13.8% at their peers, a difference of 2.4% that is statistically significant overall and for the 1984 and 1983 failures. (Over 1983-85 the difference averages 4.7%.) The means, though, conceal a considerable variance among institutions. Approximately a third of the 1983, 1984, and 1985 failures held over 30 percent of their total loans in nonresidential mortgages. (Four 1985 failures had over half their loans in nonresidential mortgages.) Thus it appears that these loans may have played a role in some of the failures, although without data on the net profits garnered from these loans, an assessment cannot be made. (BBSW do not use this variable.)

13. *Nonmortgage commercial loans to total loans (NMCLTL)* averaged only 0.6% of the failed SLAs' total loans overall, though the percentage is 1.8% at the 1985 failures and 2.0% at the 1984 failures because SLAs generally were not permitted to make these loans in prior years. The differences between the failed and nonfailed associations' holdings are very small and not significant. (BBSW do not use this variable.)

14. *Consumer loans to total loans (CLOANTL)* is significantly greater than zero at the failed SLA for all years (unlike NMCLTL), averaging 4.6% overall. With the outliers omitted, the

ratio for 1984 is 5.7% and for 1985 is 3.9%[28] Only for the 1983 failures, as compared to the nonfailed peer SLAs, are consumer loans a significantly greater proportion of total loans; and here the difference is merely 1.5%. (BBSW similarly do not find significant differences for their variable, consumer loans to total assets.)

15. *Direct investments to total assets (DITA)* averages 1.9% at the failed SLAs overall, but is 3.8% and 5.5% at the failures and 0.7% and 1.8% at their peers in 1984 and 1985. With the exception of the 1984 and 1985 failures, the differences are statistically significant. With the outliers removed, the 1984 ratio is 2.3% and the overall ratio is 1.7%, and is significant.[29] (BBSW find a significantly positive ratio of 0.3% at all three times before failure.)

Summary: Investments in Assets

The foregoing data indicate that nonmortgage commercial loans, consumer loans, and direct investments are unlikely to have been causes of the failures generally, given the levels of the variables and/or their general statistical insignificance. A further investigation of direct investments was undertaken, and is described below. To anticipate, the data (reported in Chapter II) indicate that, on the whole, direct investments yielded net profits. However, residential mortgages are significantly associated with the failures, particularly those of 1984 and 1985. Excessive risk taking, therefore, may have been a cause of the failures, but the investment risks taken do not appear to be those that SLAs were unable to take prior to federal and state deregulation actions.

(e) Growth

16. *Change in total assets (TAC)* over the five years averages 13.4% at the failed institutions and 11.9% at their nonfailed peers; the difference is only 1.5%. For only one of the failure years (1983) is the difference statistically significantly different from zero, and it is negative. It also is negative for 1985. These results are inconsistent with the FHLBB's belief that excessive growth is a general cause of failure. The data, admittedly, are subject to considerable variation, particularly of the 1984 failures where the standard deviation of the mean is 18.7%.[30] Some of the variation is due to one outlier of 391%.[31] With the five outliers removed (including two observations

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[28] CLOANTL is 63.6 at American (1984 failure), and 19.5 at Citizens (1985 failure).

[29] The change is due entirely to American, which reported DITA of 41.5.

[30] The next lowest standard deviations of the mean are 8.2 (1985) and 3.4 (1981).

with negative TAC), the failures' TAC for 1984 is 32.8% and the difference of −15.6% is not significant.

17. *Change in large liabilities to total assets (LLEAC)* averages only 3.8% for the failed SLAs, and 2.6% for the difference between the failures and their peers. The numbers are statistically greater than zero at the 1983 and 1982 failures, and for the data overall.

18. *Change in jumbo CDs to earning assets (JCDEAC)* is only 0.8% overall, and the difference between the failures and their peers is not significantly greater than zero. In fact, the difference is significant and negative (−11.4%) in only one year (1985).

19. *Change in brokered deposits to earning assets (BRKDEAC)* is small in all years except for the 1984 failures, when it is 5.9% and significant at the .05 level. With the outliers omitted, the change in the ratio is 4.6% and not significant. None of the differences between the failures and their peers is significantly greater or smaller than zero.

20. *Change in nonresidential mortgages to total loans (NRMTLC)* is very small and insignificant.

21. *Change in direct investments to total assets (DITAC)* is very small (.05% overall and 1.6% for 1985) but is statistically significant. The overall and 1984 differences between the failures and their peers are positive and statistically significant with the outliers included. With the outliers excluded, the 1984 difference is 0.6% and is not significant.

Summary: Changes

Thus changes in total assets and in the individual liabilities and assets do not appear generally associated with failure.

Individual State Failures

The financial ratios of the failed SLAs (numbers given in parentheses) in California (15), Texas (14), Florida (11), Ohio (11), and Louisiana (12) were compared to determine whether these more liberal states (with respect to SLAs' investment powers, as described further in Chapter II) differed from the U.S. experience analyzed above. The first sixteen ratios for the failures less their peers listed in Table 1 are compared and listed in Table 2. Because the peers were selected from five regions that include other states that do not permit SLAs to make direct investments, the comparison is biased towards

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[31] TAC is 391.2% at Empire. San Marino of San Marino, CA is another outlier, but it was not removed. Its TAC is 271.6%.

TABLE 2

Analysis of Failed and Nonfailed Peer SLAs in States with Liberal Direct Investment Laws
January 1, 1981 Through August 31, 1985
Means of Failures' Less Peers' Financial Ratios (in Percentages) in the Year Prior to Failure
(Probability that Mean is not Equal to Zero in Parentheses)

	California	Texas	Florida	Ohio	Louisiana	U.S.
Number of Failures	15	14	11	11	12	202
NWTA	–3.9**	–7.3**	–2.9**	–4.6**	–4.6**	–5.6**
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
RETTA	–2.2*	–3.7**	–1.0*	–2.0**	–1.9*	–2.2**
	(.02)	(<.01)	(–.01)	(<.01)	(.01)	(<.01)
NIMEA	–1.4	–2.2*	–0.8**	–1.6**	–1.4**	–1.9**
	(.12)	(.03)	(<.01)	(<.01)	(<.01)	(<.01)
YLDEA	1.8*	–0.2	0.3	–0.8	0.1	–0.1**
	(.02)	(.73)	(.42)	(.07)	(.78)	(<.01)
FEELR	4.1*	–0.2	1.0	–1.2**	0.5	1.0**
	(.05)	(.88)	(.15)	(.01)	(.62)	(<.01)
COSTFD	1.3**	0.8*	0.8**	0.0	1.2**	0.8**
	(<.01)	(.01)	(.01)	(.86)	(<.01)	(<.01)
LLEA	27.1**	26.5**	15.4**	12.2*	13.2**	19.6**
	(<.01)	(<.01)	(.01)	(.05)	(.01)	(<.01)

11. Foreclosed Mortgages to Foreclosed plus Outstanding Loans (FCLMTL)						
Failed SLAs	1.5**	3.6**	2.4**	1.3*	0.9**	0.9**
Peer SLAs	0.4	0.9	0.5	0.6	0.2	0.2
Difference	1.1**	2.7*	1.9**	0.7**	0.7**	0.7*
St. Dev. of Mean Diff.	0.2	1.3	0.6	0.2	0.1	0.3
12. Nonresidential Mortgages to Total Loans (NRMTL)						
Failed SLAs	16.2**	27.8**	21.5**	16.1**	12.3**	12.0**
Peer SLAs	13.8	23.1	14.1	12.7	12.0	12.9
Difference	2.4**	4.7	7.4*	3.4*	0.3	– 0.9
St. Dev. of Mean Diff.	0.9	3.9	3.0	1.5	1.2	1.8
13. Nonmortgage Commercial Loans to Total Loans (NMCLTL)						
Failed SLAs	0.6*	1.8*	2.0	0.1	0.2*	0.1
Peer SLAs	0.2	0.8	0.2	0.1	0.1	0.1
Difference	0.4	1.0	1.8	0.0	0.1	0.0
St. Dev. of Mean Diff.	0.2	0.7	1.5	0.1	0.1	0.1
14. Consumer Loans to Total Loans (CLOANTL)						
Failed SLAs	4.6**	4.6**	7.7**	4.6**	3.7**	3.8*
Peer SLAs	3.5	3.6	4.5	3.1	3.7	2.8
Difference	2.1*	1.0	3.2	1.5*	0.0	1.0
St. Dev. of Mean Diff.	0.5	1.1	2.2	0.6	0.6	1.3

(continued)

TABLE 1 (Continued)

Analysis of Failed Savings and Loan Associations, January 1, 1981-August 31, 1985
Means of Financial Ratios in the Year Prior to Failure
(in percentages)

Year of Failure	1981-85	1985	1984	1983	1982	1981
Number of associations	202	22	27	53	72	28
15. Direct Investments to Total Assets (DITA)						
Failed SLAs	1.9**	5.5*	3.8*	1.1**	1.0**	1.0**
Peer SLAs	0.6	1.8	0.7	0.4	0.4	0.2
Difference	1.3**	3.7	3.1	0.7*	0.6**	0.8*
St. Dev. of Mean Diff.	0.3	2.0	1.6	0.3	0.2	0.3
16. Percentage Change in Total Assets (TAC)						
Failed SLAs	13.4**	25.8**	42.0*	1.0	8.7**	11.7**
Peer SLAs	11.9	42.0	19.2	5.9	5.9	8.2
Difference	1.5	–16.2	22.8	– 4.9*	2.8	3.5
St. Dev. of Mean Diff.	2.9	10.5	17.9	2.4	2.3	3.4
17. Change in LLEA (LLEAC)						
Failed SLAs	3.8**	– 9.0	3.4	5.5**	6.6**	—
Peer SLAs	1.2	– 2.7	1.0	1.6	2.0	—
Difference	2.6**	– 6.3	2.4	3.9**	4.6**	—
St. Dev. of Mean Diff.	0.9	4.6	2.6	1.0	0.8	—

18. Change in JCDEA (JCDEAC)						
Failed SLAs	0.8	–14.3*	4.4	2.7*	2.7**	—
Peer SLAs	0.5	– 2.9	1.1	0.8	1.2	—
Difference	0.3	–11.4*	3.3	1.9	1.5	—
St. Dev. of Mean Diff.	0.9	4.9	2.6	1.0	0.8	—
19. Change in BRKDEA (BRKREAC)						
Failed SLAs	1.1*	– 1.1	5.9*	0.3	0.6	—
Peer SLAs	0.2	0.2	0.6	0.3	0.0	—
Difference	0.9	– 1.3	5.3	0.0	0.6	—
St. Dev. of Mean Diff.	0.6	2.7	2.8	0.2	0.3	—
20. Change in NRMTL (NRMTLC)						
Failed SLAs	0.3	1.1	1.4	0.1	0.0	—
Peer SLAs	0.0	0.5	0.2	0.1	– 0.1	—
Difference	0.3	0.6	1.2	0.1	0.1	—
St. Dev. of Mean Diff.	0.3	0.8	1.6	0.1	0.1	—
21. Change in DITA (DITAC)						
Failed SLAs	0.5**	1.6*	1.0*	0.2	0.2**	—
Peer SLAs	0.1	0.6	0.1	0.1	0.1	—
Difference	0.4**	1.0	0.9*	0.1	0.1	—
St. Dev. of Mean Diff.	0.1	0.7	0.4	0.1	0.1	—

**statistically significantly different from zero at the .01 level
*statistically significantly different from zero at the .05 level
Note: significance tests were not made for peer SLA means

JCDEA	24.1**	16.0**	10.9*	3.3	3.5	10.6**
	(<.01)	(<.01)	(.04)	(.24)	(.11)	(<.01)
FHLBAEA	3.8	11.0*	3.6*	9.7*	8.9**	7.2**
	(.40)	(.01)	(0.04)	(.02)	(.01)	(<.01)
BRKDEA	18.9**	8.2	–0.9	–0.1	0.2	3.7**
	(.01)	(.15)	(.22)	(.69)	(.27)	(<.01)
FCLMTL	0.8*	2.1*	0.0	1.4	0.3	1.1**
	(.04)	(.03)	(.83)	(.09)	(.51)	(<.01)
NRMTL	8.6	5.0	1.5	6.6*	3.3	2.4**
	(.09)	(.19)	(.58)	(.03)	(.20)	(.01)
NMCLTL	0.7	0.2	0.1	0.2	0.3	0.4
	(.23)	(.64)	(.63)	(.32)	(.22)	(.09)
CLOANTL	–0.3	–1.5	–1.8**	3.9*	4.7	2.1*
	(.66)	(.63)	(<.01)	(.02)	(.07)	(.02)
DITA	5.6	0.9	–0.1	1.2	0.1	1.3**
	(.08)	(.11)	(.47)	(.35)	(.37)	(<.01)
TAC	18.3	17.8	–6.3	–8.6**	1.4	1.5**
	(.39)	(.49)	(.42)	(<.01)	(.64)	(<.01)

**statistically significantly different from zero at the .01 level
*statistically significantly different from zero at the .05 level

finding relatively higher direct investments by the failed SLAs. For purposes of comparison, the ratios from all 202 U.S. failures less their peers (taken from Table 1) also are presented.

The data from the five states present a generally similar picture to that discussed above with respect to the differences in the failures' ratios compared to their nonfailed peers'. These similarities include significantly lower net worth to total assets (NWTA), return on local assets (RETTA), and net interest to earning assets (NIMEA) (except for California), and significantly higher cost of funds (COSTFD) (except for Ohio) and large liabilities to earning assets (LLEA). Insignificant difference variables include the yield on earning assets (YLDEA) (except for California), nonmortgage commercial loans to total loans (NMCLTL), and total asset change (TAC) (except for Ohio, where TAC is significantly negative). Only the California failures have a significantly higher YLDEA than their peers. Indeed, the YLDEA and fees to loan revenue (FEELR) of 1.8% and 4.1% are considerably greater than the differences at SLAs in other states.

Large liabilities to earning assets (LLEA) ratios are similarly higher at the failed SLAs compared to their peers in Florida, Ohio and Louisiana as at failed SLAs generally; the difference ratios are considerably higher in California and Texas. The distribution of liabilities also differs among the states. California failed SLAs compared to their peers have a higher percentage of jumbo CDs to earning assets (JCDEA) of 24.1%, while in Ohio and Louisiana JCDEA percentages are higher by 3.5% and 3.3%. Federal home loan bank advances to earning assets (FHLBAEA) at the failed SLAs compared to their peers are lower in California and Florida. Only California failed SLAs have statistically significantly higher brokered deposits to earning assets (BRKDEA) of 18.9%.

Several of the difference-in-ratio variables are significant only in certain states. These include foreclosed mortgages to total foreclosures and loans outstanding (FCLMTL) in California and Texas, nonresidential mortgages to total loans (NRMTL) in Ohio, and consumer loans to total loans (CLOANTL) (negative in Florida and positive in Ohio), and TAC in Ohio (negative). Direct investments to total assets (DITA) is not significantly different from zero in any of the states, though the ratio (5.6%) is higher in California than in the other states or in the U.S. generally.

Thus the individual state analyses reveal some differences with, as well as similarities to, the U.S. data. California and Texas are particularly interesting because they have been most liberal in permitting state-chartered SLAs liberal investment powers and have experienced the most failures. The data do not show that these laws have resulted in more failures. The Texas SLAs simply seem to have had lower earnings than their nonfailed peers from traditional operations. The California failed SLAs, though, had significant and higher YLDEA, FEELR, and COSTFD, and higher NRMTL than their peers. Investments in higher-yielding but riskier mortgages and construction loans may have been a cause of California SLA failures.

Because California has the most liberal law with respect to direct investments and also 41 percent (nine of 22) of the 1985 U.S. failures, the higher (though not statistically significant) DITA ratio is examined further below and in Chapter II, where analysis of the individual failures reveals that the failed SLAs' direct investments were not contributors to the failures except possibly in one instance. Given the insignificance of DITA in the other states, the univariate analysis indicates that the more liberal investment laws of the states are *not* related to SLA failures.

I. Multivariate Analysis of Financial Ratios

Methodology

The relationships also were analyzed together. The dependent variable is the identity of an association as a failure or peer. In such analyses, the possible effect of collinearity must be considered. Two independent variables might be so closely jointly related to the dependent variable, given the effect of the other independent variables, that they partially cancel each other out. When both independent variables are included in the regression, they might seem to be statistically insignificant when one or both actually is significant. Therefore, regressions were run with possibly collinear variables included and excluded. (E.g., large liabilities to earning assets was not included in the same regression as brokered deposits to earning assets and cost of funds, the ratio of net worth to total assets was excluded from some regressions, and the change-in-ratios variables were excluded from some regressions).

The dependent variable is given as a one for a failure and a zero for a nonfailed peer. The independent variables are those listed in Table 1, plus all changes in the ratios over the year previous to the year before failure, plus dummy variables for an association that is a state-chartered mutual or state-chartered stock. (Federally chartered SLAs are the omitted observations.) The charter-type dummy variables were included to measure the effect of state versus federal regulation and stock versus mutual form of organization. (As noted below, these variables could be collinear with other variables, particularly direct investments.)

Because the residuals are bounded by zero and one, a logistic regression was employed.[32] The twenty-eight 1981 failures had to be omitted from this analysis because data for 1979 (two years before their failure) that are required to compute the change-in-ratios variables were not available. Consequently, the analysis includes 178 failed and 712 nonfailed SLAs, 870 in all. (BBSW regressed ten of their independent variables on a failure-nonfailure dependent variable in logistic regressions with 318 failed and 588 nonfailed SLAs, 1982-83 data. Their findings are reported with those of the present study.)

Specification of Regressions

Several potential independent variables were not included because they are combinations of other variables. These omitted variables (plus the associated change-in-ratio variables) include:

net interest margin on earning assets (NIMEA), which is close to the return on assets (RETTA) and the approximate algebraic sum of the yield on earning assets (YLDEA) and the cost of funds (COSTFD); and

jumbo CDs to earning assets (JCDEA) and federal home loan bank advances to earning assets (FHLBAEA), which are included in large liabilities to earning assets (LLEA).

Thus 28 independent variables (including the constant term) were regressed logistically on the dependent variable (failure = 1, nonfailure = 0).

Table 3 gives the coefficients estimated and the probabilities that the coefficients are greater or smaller than zero (in parentheses). A positive significant coefficient indicates that the variable is positively associated with failure; a negative coefficient indicates an inverse relationship. Six regressions were computed and are summarized in the table.

The first regression includes all twenty eight independent variables. The remaining five regressions exclude variables that might be collinear with other variables.

The second regression excludes the state stock and mutual charter dummy variables (SMUTUAL and SSTOCK) because these were considered possibly collinear with direct investments (federally chartered SLAs could make direct investments of no more than three percent of assets). When this collinearity was not substantiated, these variables were included in the remaining regressions.

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[32] The probability of failure of a given SLA = p = $1/(1 + e^{BX})$, where X is a vector of financial ratio variables and B is a vector of coefficients. The equation can be rewritten as $\ln [p/(1-p)] = BX$, and the Bs are estimated using the multinomial logistic regression in the SAS package. Thus the coefficients given in Table 3 are not the probabilities of failure, p, associated with each variable. The fact that the sample includes all of the failures but only a portion of the nonfailures does not affect the coefficients—only the constant term, as is discussed below.

The third regression excludes large liabilities to earning assets (LLEA) and its change (LLEAC) because they could be collinear with the cost of funds and its change (COSTFD and COSTFDC), and possibly with brokered deposits to earning assets and its change (BRKDEA and BRKDEAC). These possibilities were not substantiated.

The fourth regression excludes net worth to total assets and its change (NWTA and NWTAC) because it approximately summarizes the other variables, and hence may mask their relationship with failure-nonfailure. This appears to have occurred. With NWTA and NWTAC included, the coefficients of the yield on earning assets (YLDEA), COSTFD, and COSTFDC, the change in total assets (TAC), the change in the return on earning assets (RETTAC), SMUTUAL SSTOCK, and the intercept are not statistically significant; with NWTA and NWTAC excluded, the coefficients are significant.

The fifth regression excludes LLEA and LLEAC as well as NWTA and NWTAC to determine if the coefficient of BRKDEA would be significant. Only BRKDEAC, which previously was significant at the .07 level, changed to statistically significant at the .05 level or lower.

The sixth regression excludes all of the change-in-ratio variables, but includes all of the other variables. The coefficients of YLDEA and COSTFD became insignificant, and only one of the previously insignificant coefficients became significant—TAC. Apparently it is collinear with the changes in specific assets and liabilities (as well as with NWTA).

Findings—Statistical Significance

To conserve space and make the table easier to read, variables with coefficients that are not significant at the .10 level or below in *any* of the six regressions are not shown, with two exceptions. Direct investments to total assets and its change (DITA and DITAC) are shown because these assets are the subject of restrictive regulations imposed by the FHLBB, and because the somewhat ambig-

TABLE 3

Logistic Regression Analysis—Failed (= 1) and Nonfailed (= 0) SLAs (dependent variable)
Coefficients and Statistical Significance (in parentheses)[a]

Regression	(1)	(2)	(3)	(4)	(5)	(6)
	Independent Variables Excluded					
Independent Variables	None Excluded	SMUTUAL SSTOCK	LLEA LLEAC	NWTA NWTAC	LLEA, LLEAC NWTA, NWTAC	All Change Variables
1. NWTA	−1.522**	−1.517**	−1.493**			−1.278**
	(<.01)	(<.01)	(<.01)			(<.01)
2. RETTA	−1.478**	−1.398**	−1.520**	−3.231**	−3.346**	−0.897**
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)
2C. RETTAC	0.493	0.473	0.564	1.139**	1.138**	
	(.21)	(.22)	(.14)	(<.01)	(<.01)	
4. YLDEA	0.149	0.154	0.163	0.380*	0.383*	−0.206
	(.54)	(.52)	(.49)	(.04)	(.04)	(.22)
4C. YLDEAC	−0.568*	−0.585*	−0.567*	−0.427	−0.401	
	(.04)	(.03)	(.03)	(.07)	(.09)	
5. FEELR	0.041	0.041	0.027	0.101	0.153**	0.015
	(.61)	(.61)	(.70)	(.11)	(.01)	(.80)
5C. FEELRC	−0.042	−0.029	−0.041	−0.103	−0.125	
	(.60)	(.70)	(.59)	(.15)	(.07)	
6. COSTFD	−0.227	−0.200	−0.264	−0.470*	−0.400*	0.308
	(.35)	(.41)	(.26)	(.02)	(.04)	(.08)
6C. COSTFDC	0.877**	0.853**	0.891**	0.680**	0.673**	
	(<.01)	(<.01)	(<.01)	(<.01)	(<.01)	
7. LLEA	−0.016	−0.013		0.026		−0.002
	(.41)	(.49)		(.10)		(.88)

19. BRKDEAC	0.033	0.034	0.061	0.122**	0.125**	
	(.48)	(.46)	(.11)	(.01)	(.01)	
12. NRMTL	0.040	0.042*	0.039	0.017	0.019	0.013
	(.06)	(.04)	(.06)	(.32)	(.27)	(.41)
13. NMCLTL	0.396	0.384	0.377	0.234	0.269	0.224
	(.11)	(.12)	(.11)	(.26)	(.19)	(.06)
14. CLOANTL	–0.071	–0.066	–0.068	–0.035	–0.039	–0.040
	(.10)	(.11)	(.10)	(.33)	(.27)	(.24)
15. DITA	0.012	0.008	0.007	0.154	0.198	0.135
	(.88)	(.95)	(.95)	(.27)	(.18)	(.14)
21. DITAC	0.246	0.244	0.235	0.030	0.023	
	(.15)	(.15)	(.16)	(.87)	(.91)	
16. TAC	0.014	0.012	0.014	0.015**	0.016**	0.012*
	(.11)	(.14)	(.08)	(.01)	(.01)	(.05)
22. SMUTUAL	–0.002		–0.040	–0.871*	–0.830*	–0.039
	(1.00)		(.93)	(.04)	(.05)	(.93)
23. SSTOCK	–0.750		–0.720	–0.818*	0.850*	–0.497
	(.11)		(.12)	(.03)	(.02)	(.25)
Intercept	0.106	–0.405	0.181	–5.290**	–6.061**	–1.085
	(.96)	(.85)	(.93)	(<.01)	(<.01)	(.50)
Chi-square	393	391	379	362	362	352
Rank correlation	0.952	0.951	0.951	0.889	0.889	0.935

[a] Not shown are coefficients with significance levels of .10 or higher (eight variables)
**statistically significantly different from zero at .01 level
*statistically significantly different from zero at .05 level

uous results of the univariate analysis make disclosure of the coefficients desirable. The variables not shown (listed below) can be said to be unrelated to failure. The coefficients presented in the table provide an indication of the sign and statistical significance of the relationship between a significant variable and the probability of failure. The magnitude of that probability cannot be read directly from the coefficients but depends on the levels of the variables and must be transformed. Some calculations are presented after the discussion of significance and sign.

As can be seen from the asterisks that denote significance at the .01 and .05 levels, most of the variables do not meet the usual significance criterion, given the assumption that the independent variables are mutually independent. With this caveat, only the following variables, listed in order of importance, are significantly related to failure:

Highly related to failure (consistently at .01 level of significance)

net worth to total assets (NWTA)—inversely related (the lower NWTA, the higher the probability of failure); and

return on total assets (RETTA)—inversely related and offset, partially (see Table 4), by RETTAC, which is positively related.

(Similar results for NWTA and RETTA are reported by BBSW. They also find that the logarithm of total assets is significantly inversely related to failure. This variable was not included in the present regressions because the failures and nonfailures were matched by total assets.)

Closely related to failure (generally at .05 level of significance except when collinear)

change in the yield on earning assets (YLDEAC)—inversely related; when NWTA and NWTAC are excluded (regressions 4 and 5), YLDEA is significantly positively related and can offset the negative effect of an increase in the YLDEAC (see Table 4);

change in the cost of funds (COSTFDC)—positively related; when NWTA and NWTAC are excluded, COSTFD becomes significant and inversely related, but the net relationship remains positive (see Table 4);

change in total assets (TAC)—positively related, significantly so at .05 level or below only when net worth to total assets or the other change-in-ratio variables are excluded; and state chartered (mutual and stock) (SMUTUAL and SSTOCK)—inversely related.

(None of these variables was included by BBSW. A variable somewhat similar to COSTFD, the cost of advances to total loans, is not significant.)

Related to failure (at .06 level of significance) in a few regressions

fees to total loan revenue (FEELR)—positively related, significantly so only when NWTA, NWTAC, LLEA and LLEAC are excluded (regression 5);

change in brokered deposits to earning assets (BRKDEAC)—positively related, significantly so only when NWTA and NWTAC (regressions 5 and 6) are excluded;

nonresidential mortgage loans to total loans (NRMTL)—positively related, significantly so only when SMUTUAL and SSTOCK are excluded (regression 2); and

nonmortgage commercial loans to total loans (NMCTL)—positively related, significantly so at the .06 level when the change-in-levels variables are excluded (regression 6).

(None of these variables was included by BBSW.)

Related to failure in a few regressions at the .10 level

consumer loans to total loans (CLOANTL)—inversely related. (CLOANTL was not included by BBSW.)

Not significantly related to failure

large liabilities to earning assets (LLEA)—lowest probability level in any regression is .10;

direct investments to total assets and the change in the variable (DITA and DITAC)—lowest probability level in any regression is .14; and

variables not listed on Table 3 (no probability level less than .10, most considerably greater), as follows:

brokered deposits to earning assets (BRKDEA);

foreclosed mortgages to foreclosed plus outstanding loans and its change (FCLMTL and FCLMTLC);

change in net worth to total assets (NWTAC);

change in nonresidential mortgages to total loans (NRMTLC);

change in nonmortgage commercial loans to total loans (NMCLTLC);

change in consumer loans to total loans (CLOANTLC); and change in large liabilities to earning assets (LLEAC).

(BBSW included only LLEA (measured by them as interest sensitive funds to total funds), FCLMTL, and DITA in their regressions. LLEA is significant and positive only when RETTA is omitted. FCLMTL (t statistic = 1.1) and DITA (t statistic = 0.1) are not significant. They also report nonsignificant coefficients for scheduled assets/total assets, and cash plus investment securities/total assets.)

Findings—Magnitudes

The magnitudes of the relationships can be determined from the coefficients after a suitable transformation and an assumption about the levels of the variables.[33] These calculations were made for regressions 1, 4, and 6 (all variables, all excluding NWTA and NWTAC, and all excluding all change-in-ratio variables) for the variables that are highly or closely related to failure, as listed above. The changes in the probability of failure are based on the assumption that variables other than the one under discussion remain constant at their mean values. This assumption clearly is not valid for such variables as net worth to total assets (e.g., a lower return on assets also results in a lower net worth, *cet. par.*.) Hence, the numbers calculated should be taken only as suggestive of the magnitudes of the relationships.[34]

The estimated changes in the probability of failure are given in Table 4. These numbers illustrate both the relative importance of the variables and the extent to which collinearity obscures the relationships measured. The table shows the following:

Net worth to total assets (NTWA): Assuming NWTAC is −1%, the probability of failure may increase by 5% when NWTA is 1% less than the mean, by 57% when NWTA is 3% less, and by 97% when NWTA is 6% less. Assuming NWTAC of −4% reduces the probability of failure at lower levels of negative NWTA somewhat.

Return on total assets (RETTA): With NWTA included and RETTAC of −1%, RETTA of 2%, 4% and 6% less than the mean are associated with an increase in the probability of failure of 17%, 79%, and 97%. With NWTA excluded, the increases in

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[33] The dependent variable in the logistic regressions equals $\ln [(p/(1-p)]$, where p = the probability of failure. After "plugging in" values for the variables and the coefficients estimated, the sum of the products is solved for p. Because a logarithmic relationship is used, p for any one variable depends on the levels of all the other variables as well as on the amount of that variable.

[34] A comparison cannot be made with BBSW's findings because they do not convert the logistic coefficients to probability estimates.

TABLE 4

Estimated Changes in the Probability of Failure Given Specified Changes in Statistically Significant Variables and Their Changes In The Year Before Failure and Over the Prior Year Calculated with Coefficients from Regressions given in Table 3

		Regression from which Calculated				
Independent Variables		All Variables (1)		Excluding NWTAC (4)		Excluding Changes (6)
NWTAC		–1%	–4%			NA
NWTA:	–1%	5%	1%			8%
	–2	22	11			27
	–3	57	39			58
	–4	85	74			82
	–5	95	92			92
	–6	97	97			95
RETTAC		–1%	–3%	–1%	–3%	NA
RETTA:	–2%	17%	6%	87%	55%	14%
	–3	48	25	91	90	30
	–4	79	60	92	92	52
	–5	93	86	92	92	72
	–6	97	95	92	92	85
YLDEAC		–1%	–3%	–1%	–3%	NA
YLDEA:	–2%	2%	7%	–2%	5%	–1%
	–4	2	6	–5	6	–2
COSTFDC		+1%	+3%	+1%	+3%	NA
COSTFD:	+1%	2%	18%	2%	22%	1%
	2	3	15	–2	13	3
	3	2	12	–4	6	5
BRKDEAC		+10%	+30%	+10%	+30%	NA
BRKDEA:	+10%	–5%	–3%	13%	68%	–4%
	20	–4	0	12	66	–2
	30	–2	3	10	64	1
TAC:	+ 10%		0%		1%	0%
	15		0		2	1
	20		1		3	1
	25		1		3	1
	50		2		8	3
	100		5		20	7
	200		22		56	24
	300		55		81	52
SMUTUAL:			–9%		–6%	–1%
SSTOCK:			–8		–6	–2

NA = Not applicable

the probability are 87%, 92%, and 92%. Thus, these variables provide overlapping measures at lower negative levels. As with NWTA, RETTAC of −3% reduces the probability of failure somewhat at levels of RETTA below about −4%.

Yield on earning assets—change (YLDEAC): The more negative is YLDEAC, the greater the probability of failure, but the magnitude is relatively small. YLDEAC of −3% is associated with a 5% to 6% increase in the probability of failure. Differences in the level (YLDEA) have little effect on the probability.

Cost of funds—change (COSTFDC): An increase in the change in the cost of funds of 3% is associated with an increased probability of failure ranging from 6% to 22%, depending on the regression and the level of COSTFD.

Brokered deposits—change (BRKDEAC) or level (BRKDEA) are associated with small increases in the probability of failure when NWTA is included in the regression. With NWTA excluded, 10% and 30% higher positive BRKDEAC are associated with about 12% and 66% higher probabilities of failure; the level of brokered deposits (BRKDEA) makes little difference.

Total asset change (TAC): Until the change is 100%, the associated probability of failure is not affected much. At TAC of 50%, the probability is between 2% and 8%; at TAC of 100%, the probability is between 5% and 20%. TAC of 300% is associated with higher failure probabilities of between 52% and 81%, depending on whether NWTA is included or excluded.

State chartering (SMUTUAL and SSTOCK) is associated with slightly lower probabilities of failure of between 1% and 9%.

Summary—Multivariate Analysis of Nationwide Data

The multivariate analysis indicates that NWTA, RETTA, and TAC at amounts greater than 100% are the only variables significantly and strongly associated with the probability of failure. With these variables included in the regressions, none of the specific uses or sources of funds are statistically significantly related to the failures. With NWTA excluded, higher changes in brokered deposits are associated with large increases in the probability of failure.

Individual State Failures—Multivariate Analyses

Because there are only between eleven and fifteen failures in California, Texas, Florida, Ohio, or Louisiana, not all of the independent variables could be included in the logistic regressions. The changes-in-ratio variables were excluded from consideration, and the variables chosen are those significantly related in the univariate analysis plus those of regulatory importance—brokered deposits and direct investments. Net worth to total assets (NWTA) was included in one set of regressions with return on total assets (RETTA). They proved to be strongly collinear; with NWTA included, the coefficients of RETTA are insignificant. In the regressions reported in Table 5, NWTA is excluded because it is strongly collinear with other variables. Even then, it should be recognized that with so few observations and with the possible collinearities between such variables as brokered deposits to earning assets (BRKDEA), large liabilities to earning assets (LLEA), and direct investments to total assets (DITA), the coefficients reported should be taken only as suggestive of independent relationships.

The coefficients given in Table 5 indicate that RETTA is the only variable consistently significantly related to failure. Its relationship is negative (lower RETTA is associated with a higher probability of failure), as is NWTA (which is not shown). BRKDEA is significantly related to failure (positive) only for Florida and possibly Ohio. DITA is significantly related to failure (but inversely) only for Florida. Thus, the multivariate analysis largely confirms the univariate analysis.

As noted above, the California experience is worth further analysis with respect to direct investments. Among the fifteen failures, ten held direct investments of less than ten percent of total assets in the year before failure. Six of the ten held zero or less than one percent. Among the other four, three recorded net income on direct investments over the two years before failure. The fourth (Bell of San Mateo) had a net loss amounting to only nine percent of its other losses. It was reported as failing because of unrecorded large losses on construction loans.

Among the five failures with direct investments of ten percent or more of total assets, four recorded net profits on direct investments (including Beverly Hills after post-failure total writedowns of over $95 million). The remaining failure, San Marino, failed in December 1984. According to data from the two years before its failure (1982 and 1983 are used), its losses on direct investments increased its other losses by 13 percent; if 1983 and 1984 are used as

Table 5

States with Liberal Investment Laws—Logistic Regression Analysis Coefficients and Probabilities of Statistical Significance (in parentheses)

Dependent Variable: Failed = 1; Nonfailed = 0

Independent Variables	California	Texas	Florida	Ohio	Louisiana
RETTA	−1.90**	−2.24**	−3.68**	−3.40**	−1.99*
	(.01)	(.01)	(.01)	(.01)	(.02)
COSTFD	0.29	0.45	−1.03	−2.95	0.49
	(.19)	(.64)	(.20)	(.07)	(.46)
LLEA	0.03	0.00	0.20*	0.23	−0.02
	(.19)	(.93)	(.03)	(.08)	(.78)
BRKDEA	0.04	0.25**	−2.29	−1.85	0.93
	(.20)	(.00)	a	(.59)	(.45)
DITA	0.17	−0.65	−1.81*	−0.87	0.10
	(.12)	(.16)	(.05)	(.32)	(.91)
Intercept	−8.11	−10.77	3.68	23.91	−9.38
	(.06)	(.33)	(.60)	(.12)	(.18)
Rank Correlation Between Predicted Probability and Response	0.85	0.97	0.91	0.91	0.77
Number of Observations	75	70	55	55	60

a. The standard error could not be computed. With LLEA omitted, the coefficient is positive and insignificant (probability = .87), the coefficientof DITA is insignificant and the coefficients of the other variables are largely unchanged.

* = .01 to .05 probability that coefficient is equal to zero

** = .01 or less probability that coefficient is equal to zero the two years, direct investment losses are only seven percent of other losses. The FHLBB has charged that this association was fraudulently managed; loans to insiders were specifically mentioned. (Gray, 1985, p. 4). Therefore, it seems safe to conclude that direct investments did not contribute significantly to San Marino's failure or to the failure of any other California SLA.

J. Predictions of Failures

The collinearity among the variables makes it difficult to draw meaningful conclusions about individual relationships. Hence, an additional analysis was undertaken, for three purposes. One is a test of the validity of the model. The second is a test of the assertion made by the FHLBB that the causes of failures had changed after 1983 from interest risk to asset quality.[35] The third is to determine the extent to which the regulators can use a simple model that employs publicly available data to predict failures. If failures can be predicted effectively, the regulators could target their surveillance efforts rather than impose broad-sweeping rules (even assuming that such rules are effective in limiting excessive risk taking).

Methodology

The logistic regression including all independent variables was run with data from the 125 SLAs that failed in 1982 and 1983 and their 500 nonfailed peers. The coefficients calculated were multiplied against the values of the variables for each of the observations to obtain the predicted value of the dependent variable, or Z score (as it is called in the prediction-of-bankruptcy literature). The higher the Z score, the higher the probability of failure. The percentage of failed SLAs that received a particular Z score is given in Table 6, column 2 (with the Z score in column 1). It is labeled the "expected error rate," because that is the percentage of SLAs in another sample that one would expect to have a particular Z score or less. For example, with Model "A" (panel A), 5% of the 125 failures had Z scores of .072 or less, and 75% had Z scores of .998 or less. When predictions of 1984 and 1985 failures are made using 1982-83 data, these prediction percentages should represent the best predictive accuracy that one can expect—hence the expected error rate. The expected error rate (column 2) is multiplied against 49 (the number of SLAs that

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[35] FHLBB Chairman Edwin Gray, in testimony before the Senate Committee on Banking, Housing, and Urban Affairs on July 25, 1985 (and possibly before other committees) said (Gray, 1985, p. 3):

> I began to warn, in Congressional testimony and in speeches to industry groups in late 1983 and throughout 1984 and beyond, that excessive risk taking was occurring at too many institutions and that this was leading inexorably to more and very expensive bad asset cases.

B. Excluding Change-in-Level Variables (Regression 6)—
Coefficients Calculated With Data from The Year Before Failure

0.003	0	0	0	0	59	116	132	121
0.004	1	0	0	0	55	60	108	117
0.092	5	4	2	2	16	22	31	44
0.299	10	12	5	6	5	14	10	28
0.633	25	16	12	8	2	7	4	13
0.903	50	22	25	11	1	5	1	9
0.997	75	49	37	24	0	0	0	0
1.000	90	65	44	32	0	0	0	0
1.000	95	100	47	49	0	0	0	0
1.000	100	100	49	49	0	0	0	0

C. Excluding Change-in-Level Variables (Regression 6)—
Coefficients Calculated With Data from Two Years Before Failure

0.001	0	2	0	1	81	82	159	161
0.004	1	4	0	2	37	62	73	121
0.076	5	8	2	4	26	41	51	80
0.157	10	8	5	4	15	38	29	74
0.451	25	12	12	6	4	26	8	50
0.766	50	16	25	8	1	16	2	32
0.976	75	39	37	19	0	5	0	9
0.999	90	63	44	31	0	1	0	2
1.000	95	67	47	33	0	1	0	2
1.000	100	100	49	49	0	1	0	2

failed in 1984-85) to obtain the number that are expected to receive the associated Z score (given in column 4). For example, if one decides that no more than five percent of the failures should go unidentified and if the model is as accurate in making predictions about the 1984-85 failures as it was in identifying the 1982-83 failures, all SLAs with Z scores of .359 or above should be labeled "failures." The lower the Z score used to label an SLA as a failure, the more likely that no failures will escape being predicted.[36]

Unfortunately, unless the model is perfect, greater accuracy in predicting failures is purchased at the expense of greater misidentification of nonfailures as failures. Column 6 gives the percentages of the 625 nonfailed 1982-83 SLAs that received specified Z scores or higher. For example, using Model A, 16% of the nonfailures had Z scores of .072 or above, and 1% had Z scores of .701 or above. Thus, if all 1982-83 SLAs with Z scores of .072 or higher are labeled as failures, 5% of the failures will be missed and 16% of the nonfailures will be misidentified. If a Z score of .002 is used as the cut-off, no failures will be missed, but 57% of the nonfailures will be misidentified. The optimal Z score depends on the expected loss from missing failures and from misidentifying nonfailures.[37] The expected error rate given in column 6 is multiplied against the number (196) of nonfailed 1984-85 SLAs to obtain the number that are expected to have a particular Z score (given in column 8).

The coefficients calculated from the 1982-83 data were multiplied against the values of the variables from the 1984-85 data to obtain "actual" Z scores. The number of failed 1984-85 SLAs with a given Z score or less is given in column 5, and the number of nonfailed 1984-85 SLAs with that Z score or more is given in column 9 (labeled "actual"). These numbers were converted to percentages and are given in columns 3 and 7. The actual numbers or percentages can be compared to the predicted numbers or percentages.

Similar calculations were made with data from the regression excluding all of the change-in-ratio variables to determine the effectiveness of using only data from the year prior to failure (Model B). These numbers are given in panel B of Table 6. Another calculation was made with data from two years before failure (Model C). The change-in-ratio variables could not be included because the numbers are not available for the 1982 failures. These calculations are given in panel C of Table 6.

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[36] If the number of failed and nonfailed SLAs used to calculate the Z scores were proportional to the number in the population, the Z score could approximate the expected probability of failure. However, all of the 1982-83 failures were used but only about sixteen percent of the 1982-83 nonfailures. The true probability equals $1/(1 + .16e^{-BX})$. (See Palepu, 1985, for the derivation of this formula.) This adjustment does not affect the coefficients (B) but requires the addition to the constant term of ln (.16). The Z scores reported have not been adjusted to account for the unequal sample sizes because the adjustment is not required for the purpose of choosing a cut-off point.

[37] The less-than-proportional representation of nonfailed banks in the sample does not affect this decision as long as the sample prediction error can be expected to obtain in the population. If it is reasonable to assume (as I believe it is) that the peer-group-selection process increases the probability that the peers include a higher-than-random number of potential failures, the calculated error rate is likely to overstate the error rate that would be experienced were the entire population analyzed. This conclusion is reinforced by the evidence presented below that some of the nonfailed SLAs that were identified as failures later failed.

The Findings

First, it seems reasonable to conclude that the models predict failures well and nonfailures fairly well. With respect to the 1982-83 failed and nonfailed SLAs, Models A and B identify all but two failures (5%) while misidentifying approximately 16% of the nonfailures, or all of the failures would be correctly identified at the cost of misidentifying 55% or 57% of the nonfailures. Model C is similarly successful. Correctly identifying all but two failures means incorrectly identifying only 26% of the nonfailures.[38] All of the failures would be identified at the cost of misidentifying 37% of the nonfailures.

More importantly, the 1983-84 failures are predicted about as well or better than expected. Comparing the expected with the failures' actual error rates (columns 2 and 3) or numbers (columns 4 and 5) reveals that Models A and B predicted better than expected. For example, a Z score of .072 or .092 from Models A and B is expected to miss two failures (a five percent error rate). These Z scores, though, would have correctly identified all or missed two of the 1984-85 failures. Model C (which predicts two years ahead) would have misidentified four rather than two failures. At Z scores that are expected to identify all of the failures, Models A and B do as expected, but Model C misses two failures.

The models do not do quite as well in identifying nonfailures. (Compare columns 6 and 7 or 8 and 9.) At the Z score that yields a five percent error rate for failures, Model A misidentifies 24% of the nonfailures rather than 16% as predicted, Model B 22% rather than 16%, and Model C 41% rather than 26%. At Z scores that are expected to identify almost all of the failures (one percent error rate), the expected and actual misidentification percentages for nonfailures are as follows: Model A, 57% vs. 57%; Model B, 55% vs. 60%; and Model C, 37% vs. 62%. Thus, though Model C does not do as well as predicted, the predicted percentage is low relative to the other models.

A more detailed examination of the predictions of specific observations indicates that the models predict a bit better than Table 6 shows. Two of the three Model A failures with Z scores of 1.000

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[38] It should be noted that the overall rate of incorrect predictions is a weighted sum of the failure and nonfailure prediction errors that takes account of the fact that all of the failures are represented while only about six percent of the nonfailures (194 of 3150) are included. The overall error rate is very close to the rate for the nonfailures. (E.g., at the cut-off Z score of .072 in Model A, the total error rate is 5% x (49/3150) + 16% x (3101/3150) = 15.8%.

actually are the same SLA—Farmers Savings Bank of Dixon, California; it was selected as a peer for two different failures. It failed on October 13, 1985. (The other failures since August 1985 were not included in the peer group.) This SLA also is two of the nonfailed observations with the highest Z scores in Models B and C.

A further investigation of model A's predictive ability with respect to failures was made by calculating the Z scores for twenty-four SLAs that failed in 1985 but were not included among the failures because the failures occurred after August 31 or because at that time there was no public announcement of failure.[39] All but five of the twenty-four would have been identified as a failure had the five percent cutoff been used (Z score of .072 or greater); all but one would have been identified as a failure at the one percent cutoff (Z score of .001 or above). Twelve of the twenty-four (50%) had Z scores of .83 or above. The SLA that would not have been identified as a failure at the one percent cutoff (Westside Federal of Seattle, Washington) was said by the FHLBB as having engaged in "questionable lending practices, including the funding of speculative acquisition, development and construction (ADC) loans—[that] resulted in more than $54 million in losses . . ." As a federally chartered association, it could not invest more than three percent of its assets in direct investments (in fact, it held 0.6%). Among the other four, the FHLBB states that "Guaranty's [of Harrison, Arkansas] losses resulted to a large extent from the funding of speculative acquisition, development and construction loans." Its direct investments were 0.6 percent of total assets. Guarantee had increased its assets by 597 percent in 1983, but only by 15 percent 1984. (Only the latter increase was included in Model A.) The FHLBB did not give explanations for the failure of the other three. One of these (Baton Rouge of Baton Rouge, Louisiana) recorded losses in three of its last four years of operation, including a net loss of 1.6 percent of its assets in 1982. It held direct investments of 2.7 percent of its assets; these showed a profit in each of its last five years. The remaining two had net losses in three or two of their past four years' operations, low rates of growth, and almost no direct investments. Thus, the failure of three of the five could have been predicted by an analyst who looked a little beyond the model.

Conclusions from the Prediction Study

The predictions made with the three models allow the following conclusions. First, the models appear to be reasonably well specified, because they separate and predict the failures and nonfailures fairly well; all of the failures were identified at the cost of misidentifying 56% of the nonfailures, or all but two of the failures were identified at the cost of misidentifying 16% of the nonfailures. Second, the stability of the predictions is inconsistent with the FHLBB's assertion that the causes of the 1984-85 failures are very different from the causes of the 1982-83 failures. Third, the models show that the authorities could predict failures in advance. Considering that they now examine and supervise all the SLAs, use of a prediction model would allow them to direct their oversight more effectively than they have in the past.[40]

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[39] Two additional failures were not included among the twenty-four because their financial statements could not be obtained.

K. Payouts by the FSLIC

Payouts by the FSLIC can be avoided by the closure of an association before the economic value of its equity becomes negative. Such prompt action currently is not taken for at least three reasons. First, the chartering agency (the FHLBB or a state) may delay closing an insolvent institution because it wants to avoid public criticism and hopes that conditions may improve (e.g., interest rates will decrease.) Indeed, Barth, Brumbaugh, Sauerhaft and Wang (1985B) report that FSLIC-assisted mergers and closures are inversely and significantly related to the size of the FSLIC fund. Second, there is reason to believe that the FHLBB does not monitor SLAs well.[41] Consequently, an association can engage in fraudulent, excessively risky, or incompetently managed activities for a number of years before decisive action is taken. Third, an association may obscure its activities sufficiently effectively to escape the notice of the FHLBB.

In addition, FHLBB Chairman Gray has claimed that direct investments give the FHLBB's examiners special problems because they do not understand these assets. As a result, he asserts, failed SLAs with direct investments are responsible for a large portion of FSLIC losses.

When failures are publicly announced, the FHLBB sometimes gives the present value of the payments that the FSLIC will make to assist a merger or acquisition or to pay off insured-depositors'

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[40] Barth, Brumbaugh, Sauerhaft, and Wang (1985A) conduct a similar predictive analysis. They use FHLBB December 1983 data to generate Z scores for 1984 failures through June. They report that, using a .50 Z score, the model predicted all but one of twenty-seven failures.

[41] See hearings held by the U.S. House of Representatives Subcommittee on Commerce, Consumer, and Monetary Affairs of the Committee on Government Operations on the failure of Empire Saving and Loan Association of Mesquite, Texas in 1984 (Empire Hearings, 1984), and hearings held by the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce in 1985 on the failure of Beverly Hills Savings and Loan Association of Beverly Hills, California (Beverly Hills Hearings, 1984), in which Chairman Gray testified that Empire and Beverly Hills grew inordinately while keeping poor records and investing in risky assets. Over the several years between the examiners' concern and the time the FSLIC closed or took over the associations, hundreds of millions of FSLIC-insured deposits were acquired and lost by the associations.

Table 6

Expected and Actual Number of Failed and Nonfailed SLAs in 1984-85 That Would Be Misclassified (Errors) Predicted from Logistic Model Coefficients Calculated with 1982-83 Data

1982-83 Probability Z Score (1)	49 1984-85 Failed SLAs				196 1984-85 Nonfailed SLAs			
	Error Rate		Number		Error Rate		Number	
	Expected (2)	Actual (3)	Expected (4)	Actual (5)	Expected (6)	Actual (7)	Expected (8)	Actual (9)
A. All Independent Variables (Regression 1)— Coefficients Calculated With Data from The Year Before Failure								
0.001	0	0	0	0	64	63	125	123
0,002	1	0	0	0	57	57	112	112
0.072	5	0	2	0	16	24	31	48
0.359	10	10	5	5	4	15	8	29
0.701	25	12	12	6	1	10	2	19
0.981	50	24	25	12	0	5	0	10
0.998	75	39	37	19	0	4	0	7
1.000	90	49	44	24	0	3	0	5
1.000	95	53	47	26	0	2	0	3
1.000	100	100	49	49	0	0	0	0

accounts. These amounts, ranging from zero to $350 million, were stated for 95 of the 202 official failures. (Where FSLIC payouts were given only in total for more than one failure, the observations could not be included because the amounts could not be allocated to an individual failure.) Because the data arose during a period of inflation, the dollar amounts were adjusted with the GNP deflator to 1984 values.

The effect of direct investments and other variables on the amount of FSLIC payouts was analyzed by regressing the payout amounts on the financial ratios described above plus the amount of total assets (because the amount is likely to be related simply to the size of the failed association). Nine sets of regressions were computed, with variables that might be collinear excluded systematically. The data also were disaggregated into fifty SLAs with total assets equal to or greater than $100 million (large SLAs) and forty-five with total assets less than $100 million (small SLAs).[42] Few of the coefficients estimated are statistically significant. Because these coefficients have no economic meaning, only those that are significant at the .05 level or less are given in Tables 7, 8, and 9. The tables also present the probability levels of these variables and the other insignificant variables.

The regressions show significant coefficients for the following variables, where "all", "large" and "small" denote the data on which the regression were run (see Tables 7, 8, and 9):

total assets (TA)—positive for all, large, and small;

change in total assets (TAC)—negative for all, large, and small;

change in return on total assets (RETTAC)—positive for all and small, insignificant for large;

yield on earning assets (YLDEA)—positive only for all;

brokered deposits to earning assets (BRKDEA)—positive for all, significant only for some regressions for large and small;

change in brokered deposits to earning assets (BRKDEAC)—negative for all and large, insignificant for small;

change in nonresidential mortgages to total loans (NRMTL)—positive for all, insignificant for large and small;

change in consumer loans to total loans (CLOANTL)—negative for large, insignificant for all and small;

direct investments to total assets (DITA)—positive only for small when change in direct investments to total assets (DITAC) is excluded.

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[42] The variables associated with failure or nonfailure were not disaggregated because the failures were matched to nonfailures by total assets, a procedure which controlled for the effect of size.

The positive relationship between DITA and FSLIC payouts among the small failed SLAs was examined in greater detail, particularly because Barth, Brumbaugh, Sauerhaft, and Wang (1985A) report that DITA is significantly positively related to FSLIC payouts for the 31 1982-83 failures that they studied. An examination of the 51 failures reveals that only four (8%) had net losses on direct investments over the two years prior to failure. Direct investments as a percentage of total assets (DI/TA), net income or losses before tax from direct investment (DI), net income or losses before tax from other operations (Other) (both averaged over the two years prior to failure), DI as a percentage of losses from Other (DI/Other), and FSLIC payouts (FSLIC) for each of the four and for the three other SLAs with the highest DI/TA percentages are as follows:

DI/TA	DI	Other	DI/Other	FSLIC
0.5%	$−52M	$−47,728M	0.1%	$165.0M
0.8	−40	−1,081	3.7	0
1.6	−3	−1,997	0.2	5.2
4.3	−24	−1,454	1.7	8.8
3.7	1,195	−888	−8.9	18.5
10.1	189	−2,367	−8.0	3.7
13.1	220	−656	−33.5	13.6

Net losses on direct investments increased losses from other investments by from 0.1% to 3.7%. In contrast, the two SLAs with more than small percentages of direct investments to assets obtained net profits that substantially reduced their losses from other operations. Therefore, it seems unlikely that the significant coefficient in the small SLA regressions is a meaningful indicator of a causal relationship between direct investments and FSLIC payouts.

Consumer loans to total loans (CLOANTL) is not significantly related to FSLIC payouts in any of the 27 regressions save one (small SLAs with some variables omitted.) The change in the ratio (CLOANTLC) is significantly negative in three of the large SLA regressions, which indicates that consumer loans may be inversely related to FSLIC payouts. Commercial loans to total loans (NMCLTL) and its change (NMCLTC) are not significantly related to FSLIC payouts. The change in brokered deposits is significantly inversely related in many of the regressions, and the level is positively related in a few regressions.

Thus, the analysis does not support the assertion that FSLIC payouts have been greater as a consequence of the additional investment or fund-gathering powers that SLAs have been given.

TABLE 7

Present Value of FSLIC Payments Regressed on Financial Variables in the Calendar Year
Before Failure and Changes From the Year Previous
Probability that Coefficient is Equal to Zero
Coefficients Given in Parentheses Where Probability is .05 or less
All 95 Observations

Mean of Dependent Variable = $14.0 million

Regression	1	2	3	4	5	6	7	8	9
Independent Variables									
TA	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
	(.05)	(.04)	(.05)	(.05)	(.05)	(.05)	(.05)	(.05)	(.05)
TAC	<.01	<.01	.01	.02	.02	—	—	—	—
	(−.38)	(−.28)	(−.25)	(−.19)	(−.19)				
NWTA	.19	.43	.51	—	—	.44	.46	—	—
NWTAC	.93	.20	.40	—	—	—	—	—	—
RETTA	.46	—	—	—	—	—	—	—	—
RETTAC	.01	—	—	—	—	—	—	—	—
	(11.0)								
NIMEA	.81	—	—	—	—	—	—	—	—
NIMEAC	.91	—	—	—	—	—	—	—	—
YLDEA	—	.06	.04	.03	.02	.05	.04	.06	.06
		(6.2)	(6.7)	(7.3)	(7.6)	(5.7)	(5.7)	(5.2)	(5.2)
YLDEAC	—	.60	.72	.73	.71	—	—	—	—
FEELR	.53	.41	.75	.87	.84	.81	.71	.70	.66
FEELRC	.18	.95	.98	.51	.59	—	—	—	—
COSTED	—	.78	.38	.93	.90	.46	.35	.46	.39

COSTFDC	—	.19	.24	.26	.29	—	—	—	—
LLEA	.83	.45	—	.85	—	.83	—	.96	—
LLEAC	.05	.22	—	.52	—	—	—	—	—
	(1.2)								
BRKDEA	<.01	.02	.08	.26	.33	.05	.05	.02	.02
	(4.4)	(2.8)	(1.9)			(1.2)	(1.2)	(1.4)	(1.4)
BRKDEAC	<.01	<.01	<.01	.03	.04	—	—	—	—
	(−6.7)	(−5.9)	(−4.3)	(−2.8)	(−2.5)				
FCLMTL	.13	.51	.81	.85	.89	.51	.50	.50	.49
FCLMTLC	.83	.34	.26	.38	.36	—	—	—	—
NRMTL	.50	.76	.92	.79	.72	.99	.99	.98	.98
NRMTLC	.01	.01	.03	.09	.09	—	—	—	—
	(2.7)	(2.6)	(2.2)	(1.6)	(1.6)				
NMCLTL	.13	.07	.11	.57	.48	.56	.58	.60	.59
NMCLTLC	.17	.05	.10	.69	.60	—	—	—	—
CLOANTL	.47	.32	.41	.15	.17	.20	.20	.23	.23
CLOANTLC	.91	.33	.26	.92	.97	—	—	—	—
DITA	.88	.57	.52	.20	.22	.13	.14	.12	.12
DITAC	.87	.29	.15	.05	.05	—	—	—	—
			(12.1)	(12.1)					
SMUTUAL	.69	.61	.75	.71	.68	.46	.47	.45	.44
SSTOCK	.75	.56	.50	.23	.32	.29	.29	.33	.32
Intercept	.23	.10	.01	.08	.02	.21	.21	.26	.24
			(−97)		(−89)				
R^2 (adjusted)	.72	.72	.72	.70	.70	.65	.65	.65	.65

TA = millions
Other variables in percentages

TABLE 8

Present Value of FSLIC Payments Regressed on Financial Variables in the Calendar Year
Before Failure and Changes from the Year Previous
Probability that Coefficient is Equal to Zero
Coefficients Given in Parentheses Where Probability is .05 or less
44 Observations with Total Assets Equal to or Greater than $100 million

Mean of Dependent Variables = $14.0 million

Regression.	1	2	3	4	5	6	7	8	9
Independent Variables									
TA	<.01 (.05)	<.01 (.05)	<.01 (.05)	<.01 (.06)	<.01 (.06)	<.01 (.06)	.10 (.06)	<.01 (.06)	<.01 (.06)
TAC	.01 (−.72)	.01 (−.67)	<.01 (−.71)	<.01 (−.78)	<.01 (−.79)	—	—	—	—
NWTA	.58	.21	.33	—	—	.34	.30	—	—
NWTAC	.87	.98	.86	—	—	—	—	—	—
RETTA	.61	—	—	—	—	—	—	—	—
RETTAC	.99	—	—	—	—	—	—	—	—
NIMEA	.90	—	—	—	—	—	—	—	—
NIMEAC	.87	—	—	—	—	—	—	—	—
YLDEA	—	.29	.29	.20	.17	.13	.15	.20	.23
YLDEAC	—	.61	.91	.86	.98	—	—	—	—
FEELR	.61	.86	.95	.91	.84	.70	.81	.46	.55
FEELRC	.87	.98	.86	—	—	—	—	—	—

COSTFD	—	.57	.60	.28	.27	.55	.75	.60	.88
COSTFDC	—	.61	.86	.57	.51	—	—	—	—
LLEA	.43	.25	—	.54	—	.56	—	.48	—
LLEAC	.70	.33	—	.58	—	—	—	—	—
BRKDEA	.16	.16	.22	.05	.05	.26	.21	.17	.12
				(10.5)	(9.6)				
BRKDEAC	.05	.01	.01	.01	<.01	—	—	—	—
	(−20.8)	(−18.4)	(−17.4)	(−16.7)	(−16.2)				
FCLMTL	.45	.81	.47	.97	.73	.39	.32	.36	.27
FCLMTLC	1.00	.64	.81	.61	.75	—	—	—	—
NRMTL	.95	.89	.88	.54	.66	.57	.56	.54	.52
NRMTLC	.13	.30	.18	.29	.18	—	—	—	—
NMCLTL	.47	.53	.43	.85	.99	.85	.92	.78	.86
NMCLTLC	.32	.32	.32	.81	.73	—	—	—	—
CLOANTL	.45	.26	.26	.50	.46	.13	.13	.15	.15
CLOANTLC	.09	.03	.03	.07	.05	—	—	—	—
		(−24.1)	(−23.0)	(−20.2)	(−20.0)				
DITA	.53	.26	.18	.08	.07	.81	.77	.81	.82
DITAC	.57	.78	.96	.94	.84	—	—	—	—
SMUTUAL	.53	.48	.30	.74	.53	1.00	.89	.87	.99
SSTOCK	.47	.25	.22	.12	.11	.40	.41	.61	.67
Intercept	.92	.52	.54	.71	.66	.23	.11	.32	.17
R^2 (adjusted)	.78	.81	.81	.79	.81	.64	.65	.64	.65

TA = millions
Other variables in percentages

TABLE 9

Present Value of FSLIC Payments Regressed on Financial Variables in the Calendar Year
Before Failure and Changes from the Year Previous
Probability that Coefficient is Equal to Zero
Coefficients Given in Parentheses Where Probability is .05 or less
51 Observations with Total Assets Less than $100 million

Mean of Dependent Variables = $2.4 million

Regression	1	2	3	4	5	6	7	8	9
Independent Variables									
TA	.23	.04 (.05)	.02 (.06)	.01 (.06)	<.01 (.07)	.01 (.06)	<.01 (.07)	<.01 (.06)	<.01 (.07)
TAC	.31	.48	.64	.45	.68	—	—	—	—
NWTA	.28	.65	.59	—	—	.64	.92	—	—
NWTAC	<.01 (−3.29)	.41	.21	—	—	—	—	—	—
RETTA	.09	—	—	—	—	—	—	—	—
RETTAC	.02 (2.0)	—	—	—	—	—	—	—	—
NIMEA	.05 (−.82)	—	—	—	—	—	—	—	—
NIMEAC	.54	—	—	—	—	—	—	—	—
YLDEA	—	.79	.48	1.00	.82	.16	.20	.17	.20
YLDEAC	—	.98	.78	.84	.92	—	—	—	—
FEELR	.62	.63	.36	.37	.51	.36	.04 (.32)	.30	.04 (.32)
FEELRC	.96	.04	.09	.04	.09	—	—	—	—

		(.59)		(.58)					
COSTFD	—	.57	.54	6.1	.75	.55	.72	.54	.71
COSTFDC	—	.68	.54	.94	.77	—	—	—	—
LLEA	.23	.06	—	.03	—	.12	—	.14	—
				(.14)					
LLEAC	.78	.26	—	.24	—	—	—	—	—
BRKDEA	.02	.53	.21	.19	.04	.24	.11	.27	.10
	(.61)				(.35)				
BRKDEAC	.47	.65	.51	.78	.55	—	—	—	—
FCLMTL	.59	.35	.11	.51	.19	.03	.05	.03	.05
						(.38)	(.34)	(.38)	(.35)
FCLMTLC	.76	.08	.03	.06	.02	—	—	—	—
		(.77)	(.96)	(.80)	(1.05)				
NRMTL	.86	.60	.40	.39	.23	.07	.08	.06	.07
NRMTLC	.60	.67	.83	.34	.76	—	—	—	—
NMCLTL	.55	.73	.22	.78	.25	.18	.41	.19	.40
NMCLTC	.93	.74	.23	.88	.32	—	—	—	—
CLOANTL	.01	.13	.09	.19	.19	.64	.53	.58	.52
	(.30)								
CLOANTLC	.01	.24	.42	.36	.41	—	—	—	—
	(1.25)								
DITA	.26	.68	.67	.51	.42	.01	<.01	<.01	<.01
						(.68)	(.77)	(.69)	(.77)
DITAC	.33	.20	.18	.24	—	—	—	—	—
SMUTUAL	.58	.58	.12	.60	.12	.26	.13	.28	.12
SSTOCK	.82	.48	.32	.44	.24	.93	.73	.94	.73
Intercept	.54	.63	.30	.82	.63	.21	.29	.21	.29
R^2 (adjusted)	.80	.65	.62	.67	.62	.51	.49	.52	.50

TA = millions
Other variables in percentages

L. Analyses of Individual Failed SLAs

Statistical analysis often obscures the reasons for failures for three important reasons. First, the variables used may provide incomplete or even misleading measures of financial distress. In particular, the amount of direct investments held does not provide an indication of whether or not these investments were profitable. Second, the variables may be collinear. Consequently, a variable that is not a cause of failure may appear to be causally related because it is associated with another variable that is a cause. Third, the period over which the data are measured may not be optimal for all observations. For example, a failure could be caused by several years of smaller losses rather than large losses in the year before failure. Therefore, the financial statements of individual failures over the three or four years prior to their failure were studied.[43]

Twenty-one failures were selected for analysis. The selection criterion was the association's having more than five percent of its assets directly invested over the year prior to its failure.[44] This criterion was used because of the regulatory interest in direct investments. Unfortunately, its use results in a biased view of the average failed SLA, because SLAs with direct investments tend to be those that were growing faster or were more adventurous. Those that failed because negative interest rate spreads slowly used up their net worth tend to be underrepresented. Furthermore, as mentioned above, insolvent SLAs that have not been closed also are not included. An indication of this latter bias is provided by the listing by Veribank Inc. of 1,391 SLAs with negative tangible net worth on December 31, 1984. Included in this number are 71 with negative net worth exceeding $100 million each, of which nine had negative net worth exceeding $500 million each.

Appendix A gives brief narrative analyses of the eight failed SLAs with over ten percent invested in direct investments.[45] Table 10 provides a summary of all twenty-one individually analyzed failures. The table and the individual narratives show that the reasons for the failures are quite diverse. High asset and liability growth is an important reason for eleven of the twenty-one failures (52%), but is not associated at all with the balance. Nine of the failures (43%) experienced high interest rate expenses relative to revenue, usually (but not always) associated with high growth rates, and much less often with brokered deposits. Indeed, while high levels of brokered deposits were found at nine of the failures, two of these did not have high rates of growth, and five did not have high interest rates relative to revenue. Five SLAs (24%) recorded high large non-operating expenses. Nine (43%) recorded or were later found to have incurred large loan losses, often (but not exclusively) related to ADC and other nonresidential loans and mortgages. Five (24%) of the failures analyzed had losses on direct investments over the two years before failure. One SLA's direct investment losses were 18% of its losses from other operations, and for the other four direct investment losses were 3%, 7%, 9%, and 14% of net income from other operations. The others recorded net income on direct investments that reduced their losses from other sources, often substantially. Thus direct investments do not appear to be a cause of the failures.[46]

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[43] Only two years of data were studied for the two SLAs that failed in 1981 because financial statements before 1979 were not available to me.

[44] Included in the twenty one are three associations with direct investments/total assets over the year prior to failure that are less than five percent. These associations' financial statements were analyzed for a previous study, where the selection criterion was DI/TA as of the year-end. Because the analysis of these SLAs was completed, they were not excluded from the present analysis, which added ten SLAs to the eleven previously analyzed. See Benston (1984C) Tables 10, 10-1 through 10-11, and Appendix A.

[45] Benston (1984C) Tables 10-1 through 10-11 also gives summary financial statements and narrative descriptions of eleven SLAs with direct investments/total assets of more than five percent at the year-end before failure that failed between January 1, 1981 and June 30, 1984. Four of these narratives are among the eight given in the appendix. Narrative analyses of the balance are not presented in the appendix to conserve space.

M. Conclusions

All 202 official failures, the failures in five states that enacted relatively liberal laws with respect to SLAs' investments (California, Texas, Florida, Ohio, and Louisiana), and twenty-one individual SLAs with direct investment of five percent of total assets or more were analyzed. The principal variable associated individually with the failure of SLAs (in the year prior to failure and in comparison with nonfailed peers) is low or negative net worth to total assets (averaging −5.6%), which hardly is surprising. Negative returns on total assets (averaging −2.2%) appear to have caused the negative net worth, and the negative returns were the result largely of negative interest rate margins (averaging −1.9%). These lower margins appear due to higher cost of funds rather than to lower yields. The higher cost of funds (averaging 0.8%), in turn, is associated with higher levels of large liabilities (19.6%), including jumbo CDs (10.6%), federal home loan bank advances (7.2%), and brokered deposits (3.7%). No clear trend over the years studied is evident, except for higher levels of jumbo CDs and brokered deposits at the 1984 and 1985 failures.

On the asset side of the balance sheet, foreclosed mortgages are higher (averaging 1.1%), particularly among the 1984 and 1985 failures than among nonfailed peer associations. Nonresidential mortgages also are a higher percentage of their total loans (by an average of 2.4%). However, the failed SLAs did not hold higher percentages of nonmortgage commercial loans and consumer loans compared to their peers. Direct investments are higher percentages of total assets, though not significantly higher at the 1985 and 1984 failures, and of small magnitude on average (.08%, 0.6%, and 0.7% in 1981, 1982, and 1983—1.3% overall). A more detailed analysis of net profits and losses on direct investments, presented in Chapter II, indicates that these investments were profitable or did not significantly increase other losses at the failed SLAs (with one possible exception).

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[46] An additional discussion that focuses on the distinction between "true" direct investments, as the term is used here, and loans that could be classified as direct investments, is provided in Chapter II.

Growth in total assets is not related to failure, on the average. However, the overall increase in large liabilities of 2.6% and in direct investments of 0.4% appears associated with the failures.

The multivariate analyses largely confirmed the univariate analysis, with a few important exceptions. Net worth to total assets and the return on total assets are highly inversely related to failures. The change in the yield on earning assets tends to be inversely related, the change in the cost of funds positively related, and the change in total assets positively related to failures. State rather than federally chartered SLAs have somewhat lower rates of failure. In terms of magnitudes, the principal variables related to failure are net worth to total assets, the return on total assets, and the change in total assets over 100 percent. Nonmortgage commercial loans, consumer loans, direct investments, brokered deposits, and foreclosed loans are not significantly positively related to failure. Thus, the multivariate analysis confirms the univariate analysis with the exception that a significant relationship between loan losses, brokered deposits, and direct investments was not found.

The multivariate model was estimated with data from the 1982-83 failures to predict failures and nonfailures in 1984-85. The model predicts failures and nonfailures in the latter period as well as it separates them in the earlier period. This finding is consistent with the hypothesis that the causes of failures in 1984-85 were not very different from the causes in 1982-83, which is inconsistent with the FHLBB's assertion to the contrary. The predictions also indicate that the FHLBB could improve its effectiveness in predicting failures and monitoring SLAs that might fail.

The amounts paid out by the FSLIC at the 95 SLAs for which these data are published were examined to determine which financial variables are associated with higher or lower payouts. The only significantly related variables are total assets (positive), yield on total assets (positive), brokered deposits (positive), change in brokered deposits (negative), and nonresidential mortgages (positive). Nonmortgage commercial loans, consumer loans, and direct investments are not positively associated with FSLIC payouts, with one exception. Direct investments at smaller SLAs are significantly related. However, an examination of the net profits and losses on direct investments at individual failures reveals that this statistical relationship probably is spurious.

Analyses of the individual financial statements of twenty-one SLAs over the two to four years prior to their failure supplements the statistical analyses. The SLAs analyzed include all those that held direct investments that exceeded five percent of their assets over the year prior to failure. This biased sample confirms the findings of the statistical analysis, with the exception that growth of total assets and liabilities is seen to be more importantly related to the failures. Direct investments, however, do not appear to be so related, even though the sample was chosen to focus on the failed SLAs that held these assets.

Thus, the data indicate that SLA failures, on the average, appear primarily due to interest payments that exceeded interest income. Foreclosed mortgages played a small role. Brokered deposits may have played a role, although the relationship is not consistent. Very high rates of growth are associated with the failure of some SLAs. Deregulated assets, though, do not appear responsible for failures. Nonmortgage commercial loans and consumer loans are not related to the failure. Nor are the two variables that are the subjects of special regulations—direct investments and growth—related to failure, on the average, although very high rates of growth appear to be important factors in the failure of several SLAs. These conclusions are based in part on the data analyzed in this chapter and on the analyses in Chapters II and III.

Appendix Chapter I

Analyses of Individual Failed Associations with Five Percent or More of Assets in Direct Investments

The following analyses are based on the associations' balance sheets and income statements (as filed with the FHLBB and made available by Cates Consulting Analysts, Inc.) for the four years prior to failure, with the exception of those associations that failed in 1982 and 1981, since financial statements only through 1979 are available in the Cates system. The brief reviews presented discuss what appear to be the most pertinent aspects of the failed associations' financial data.

Centennial, Guerneville CA, failed 1985, $316 million total assets, 44.5% direct investment to total assets

The total assets of this association were $14 and $18 million at year-end 1980 and 1981. By year-end 1984, its total assets were $316 million, an increase of 2,172% over 1980. In 1983 the increase was 361% over 1982. Brokered deposits played an important role in its growth; these were 26% of total liabilities in 1982, 28% in 1983, and 40% in 1984 (year-end data).

In terms of dollars, the great increase occurred between 1982 and 1984. Taking year-end 1982 as the base year, total assets increased by $267 million (557%). $75 million (28%) was placed in residential mortages, $19 million in mortgages secured by other improved real estate (7%), and $155 million (58%) in direct investments. Virtually no commercial or consumer loans were held.

Centennial's failure appears due to earnings that were insufficient to offset its much higher interest payments. Negative net interest margins of 8.2% and 3.5% were experienced in 1984 and 1983. However, over these two years it recorded net profits from direct investments of $7.7 million, which offset its losses of $4.1 million from other operations. Nevertheless, interest expense continued to erode its declining equity, until it failed in 1985.

American, Biloxi MS, failed 1984, $9 million total assets, 38.6% direct investments to total assets

This small association more than tripled its 1980 assets before it failed. Its direct investments were entirely in subsidiary equity acquired in 1982. This investment returned $346,000 and $303,000 in 1983 and 1982, which decreased the association's net losses from other operations of $2,890,000 and $4,869,000. These crippling losses appear due to the 264% increase in the association's assets in 1982 that were financed primarily with broker-originated CDs of $100,000 and over (jumbo CDs). In 1983 and 1982 interest on and commissions paid for these funds were more than triple and double total interest earnings. In addition, in 1983 and 1982 the association recorded losses on sales or revaluations of loans of $1,487,000 and $3,327,000, and considerable non-operating expenses. Furthermore, at the time the equity investment in subsidiaries was acquired, the association booked a larger amount of "other closed-end consumer loans," which were largely written off in 1983.

Beverly Hills, Los Angeles CA, failed 1985, $2,854 million total assets, 16.5% direct investments to total assets

This large association was taken over by the FHLBB after a series of damaging events. It had grown spectacularly. By year-end 1982 its assets almost doubled (a 195% increase) over year-end 1980. (Numbers based on financial statements revised in 1985.) By 1983, assets were 464% of the 1980 figure and by 1984 the increase was 680% of the 1980 amount. As percentages of total assets, over this four year period mortgage loans declined slightly from 70% to 63%, although the composition shifted from residential mortgages (which went from 45% to 31%) to other improved real estate (26% to 38%). Nonmortgage loans (commercial and consumer) declined from 14% to 1% of total assets and direct investments increased from 4% to 16%. Net worth as a percentage of assets declined from 1980 through 1984 as follows: 8%, 4%, 3%, 3%, and −1%.

In 1984 a proxy fight resulted in the ouster of the management that was responsible for the growth. During this year, reports by FHLBB examiners warned that the association's records were badly maintained and that it was unable to manage the growth that had occurred. Nevertheless, the new management continued the pattern of poorly managed growth without interference by the FHLBB, as total liabilities increased by $996 million. This increase was funded principally by $826 million in deposits (of which 84% were brokered), and $154 million of "other" borrowings.

The association reported the following net profits (or losses) for 1981 through 1984, in millions of dollars: ($15.5), $4.1, $7.1, and ($12.5). A subsequent audit increased the 1984 loss to $107.9 million. The CPAs reduced mortgages by $77 million, other securities by $5 million, and direct investments by $13 million. Before 1984, interest income exceeded interest expense. But, in 1984 the adjusted figures show a negative net interest margin of $14.6 million. In that year, operating expenses increased by $148.6 million, and loan writeoffs by $63 million. Direct investments net income was $11.5 million (after writedowns), down from $13.0 million in 1983.

Cleveland Community Sav. Co., Cleveland OH, failed 1983, $17 million total assets, 16.4% direct investments to total assets

This small association's direct investments were entirely in subsidiary equity acquired in 1981. This investment returned significantly important net profits in 1982 and 1981 of $303,000 and $137,000 that reduced the association's net losses before taxes from other operations of $824,000 and $488,000 by 36.8% and 28.1%. The losses were due primarily to interest expense on liabilities generally (including federal home loan bank advances) having increased more than interest income. (The association reported no brokered deposits.)

Butterfield, Temecula CA failed 1985, $831 million total assets, 13.2% direct investments to total assets

This association's total assets increased considerably after year-end 1981, from $46 million to $831 million at year-end 1984, an increase of 1,707%. (The annual increases in 1983 and 1984 were 391% and 69%.) Brokered deposits were used to a considerable extent; as a percentage of earning assets, these were 57% and 93% in 1984 and 1983. Jumbo CDs were 101% of earning assets in 1983, but this percentage dropped to 39% in 1984; apparently many of the largely uninsured depositors knew enough to remove their funds before Butterfield failed.

The increase of $785 million in assets between 1981 and 1984 was invested as follows: 43% in residential mortgages; 27% in mortgages secured by other real estate and land, 14% in direct investments, and 6% in securities and other investments. There were no nonmortgage commercial loans and only 1% in consumer loans. Butterfield's net income was positive until 1984, when it recorded $61 million in interest and dividend income and $5.4 fees, but $75.4 million in interest expense. It also lost $6.1 million in real estate foreclosure and $1.0 million in other loan losses. A net profit was realized on direct investments of $12.6 million, but losses on other operations totaled $31.7 million.

San Marino, San Marino CA, failed 1984, $682 million total assets, 12.9% direct investments to total assets

This association failed in December 1984 after an incredible growth in assets from (year-end numbers) $29 million in 1980 to $60 million in 1981, $183 million in 1982, $682 million in 1983, and $857 million at year-end 1984—a growth of 2,955% over four years. Until 1983, net income was small—in millions, $0.1 in 1980, $0.1 in 1981, and $1.7 in 1983. In 1983 net income rose to $5.8 million, but in 1984 a net loss of $25.1 million resulted in the failure of the SLA.

The growth was fueled partially by brokered deposits, although these declined from 47% of total liabilities in 1982 to 5% in 1984. Nonbrokered deposits and (to a lesser extent) federal home loan bank advances provided most of the $730 million increase over 1983 and 1984. Deposits over $100,000 decreased over this period from 52% to 13% of total liabilities. The funds were invested primarily in mortgages, with mortgages on dwellings decreasing from 72% to 43% of assets in 1980, and mortgages on other improved real estate increasing from 0% to 14%. Nonmortgage commercial and consumer loans were trivial, and direct investments increased from 0% to 19% of total assets.

Interest income exceeded expense until 1984, when a $5.3 million negative margin was recorded. Operating expenses did not increase inordinately. But in 1984 loans were written down by $9.1 million. Direct investments had small net losses (in millions) of $1.1 in 1982, $0.8 in 1983, and $0.3 in 1984. The FHLBB has claimed that the officers of the association made self-serving and fraudulent loans.

Scandia, Des Moines IA, failed 1984, $68 million total assets, 10.9% direct investments to total assets

This small association had direct investments in real estate and subsidiaries that remained at about the same levels since at least 1980. The average $3,500,000 invested in real estate resulted in a recorded net gain of $16,000 over the four years 1980-83. The average $2,800,000 subsidiary equity investment returned an average of $284,000 per year over 1980-82 and a loss of $32,000 in 1983. The association had before tax losses in 1980 and 1981 from other operations of $329,000 and $856,000 that jumped in 1982 and 1983 to losses of $2,289,000 and $2,445,000. These losses were due primarily to negative net interest margins and an increase in non-operating

Table 10

Summary of (Often Overlapping) Factors Related to the Failure of the Twenty-One SLAs With Over Five Percent of Total Assets in Direct Investments in the Year Prior to Failure

				DI	DINBT/	Substantial Increase in Expense Due To						
SLA and State	YF	TA	DI/TA	I/L	OLOSS	FHLB	JCD	BD	NNIM	LL	NOE	GROW
Centennial, CA	85	316	45	I	171%			X	X			X
American, MS	85	9	39	I	8		X	X		X	X	X
Beverly Hills, CA	85	2854	17	I	9(a)			X	X	X		X
Cleveland, OH	83	17	16	I	34	X			X			
Butterfield, CA	85	831	13	I	42		X	X	X	X		X
San Marino, CA (b)	84	682	13	L	7	X	X		X	X		X
Scandia, IA	84	68	11	I	8				X		X	
Presidio, CA (c)	85	220	11	I	59(f)			X		X		X
Anchor, NJ	83	1907	8	I	37				X		X	X
First Financial, IL	82	634	7	I	65	X	X					X
Republic, TX	82	258	7	L	14	X	X				X	
American Heritage, IL	84	273	7	I	3				X			
Fidelity, MD	84	151	6	I	1	X			X	X		
Palos, IL	81	97	6	L	18	X	X		X			
Bell, CA (d)	85	1958	6	L	9(f)		X			X		X

Central, CA	85	2526	6	I	7				X		
Queen City, WA	84	234	6	I	24		X	X		X		X
First Suffolk, VA	82	88	6	I	31	X	X	X				
New North Miss, M	84	115	5	I	2		X	X		X	X	
Bell, TX (e)	85	370	5	L	3(f)			X		X		X
Perpetual, IL	81	48	5	I	117	X	X					

Notes:

YF = year of failure
TA = total assets during year prior to failure ($ millions)
DI/TA = direct investments as a percentage of total assets during year prior to failure (percentages)
DI I/L = direct investment net income (I) or loss (L) before tax, average of two years before failure
DINBT/OLOSS = direct investment net income or loss before tax to loss from other sources
FHLB = interest on advances from the federal home loan banks
JCD = interest on jumbo CDs ($100,000 and over) and other high-rate certificates
NNIM = negative net interest margin
LL = losses on loans
NOE = large non-operating expenses
GROW = very high rate of growth of assets and debt

(a) After post-failure adjustment; before DI net income was greater and DINBT/OLOSS = 89%
(b) Fraud is alleged; failed Dec. 1984, DINBT/OLOSS is for 1984-83, DINBT/OLOSS for 1983-82 = 7%
(c) Reported as failed because of unrecorded loss due primarily to "poorly underwritten construction loans and speculative investments in real estate joint ventures and futures and options contracts."
(d) Reported to have incurred an unrecorded $60 million loss for fourth quarter 1984 due to bad construction loans.
(e) Reported to have incurred unrecorded losses on "speculative and possibly criminal real estate activities."
(f) Percentage is increase (if DI = I) or decrease (if DI = L) of net income from other sources.

expenses from $188,000 in 1982 to $1,007,000 in 1983. The association had no brokered deposits and few outstanding jumbo CDs.

Presidio, San Francisco CA, failed 1985, $220 million total assets, 10.8% direct investments to total assets

Presidio's growth began after 1981, when its assets increased from $16 million to $220 million (1,122%). In 1983 the annual increase was 204% and in 1984 the increase was 77%. Brokered deposits were 69% of its earning assets in 1984 and 48% in 1983. Jumbo CDs were only 27% of earning assets in 1984, down from 76% in 1983. The funds obtained were invested principally in mortgages on dwellings (39%), mortgages on other real estate and land (13%), direct investments (18%), and securities and other investments (20%).

Unlike many other SLAs, Presidio reported positive net interest margins of 1.1% in 1984 and 6.8% in 1983. Indeed, it recorded net income in the two years before it failed averaging $1.6 million on direct investments and $2.7 million on other operations. Its failure was said by the FHLBB to have been due primarily to "poorly underwritten construction loans and speculative investments in real estate joint ventures and futures and options contracts."

II. Direct Investments: Risk and Return

A. Definition of Direct Investments and Distinction from Loans

Definition

"Direct investments" refers to assets, other than those used for ordinary SLA operations and property obtained from loan foreclosures, that are directly owned and managed by SLAs. These assets are primarily real-estate related; they include land held for development or resale, the construction and management of housing and commercial properties, and equity in service corporations that own and manage real estate and that provide real-estate-related services to the public. However, direct investments can include other investment assets, such as equity in other types of corporations or businesses.

The FHLBB requires SLAs to report the amount from only two categories of direct investments: "real estate investments held for development/investment/resale" and "service corporation subsidiaries: equity investment." Equity securities in other corporations and businesses are to be reported with "other investments," and, in any case, it is generally thought (if not confirmed) that most SLAs hold no or very small amounts of equity securities. In practice, the category "other investments" subsumes primarily debentures, including high-yield, low-grade "junk bonds," which are not direct investments.

Loans Classified as Direct Investments

A considerable controversy exists over the classification of some loans as direct investments. In April 1985, the FHLBB adopted a "statement of accounting policy relating to acquisition, development and construction (ADC) loans."[1] SLAs are required to report these loans as real estate (direct) investments if the loans are structured to give the associations "virtually the same risks and potential rewards as those of owners or joint venturers." (p. 9) If a loan has most of the following six characteristics, the rule states that it should be treated as a direct investment (pp. 10-11):

"(1) The lender commits to provide all or substantially all neces-

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[1] 12 CFR Part 571, "Accounting Policy Relating to Acquisition, Development and Construction Loans," No. 85-291, April 18, 1985, adding a new §571.17.

> sary funds to acquire the property and to complete the project. The borrower has title to, but little or no equity in, the underlying property.
>
> (2) The lender funds the loan commitment or origination fees or both by including them in the amount of the loan. Often, the transaction is structured to maximize the immediate or early recognition of such fees as income.
>
> (3) The lender completely funds interest during the term of the loan by adding the interest to the loan balance.
>
> (4) The loan is secured only by the ADC project. The lender has no recourse to other assets of the borrower, and the borrower does not guarantee the debt. . . .
>
> (5) In order for the lender to recover the investment in the project, the property must be sold to independent third parties, the borrower must obtain refinancing from another source or the property must be placed in service and generate sufficient net cash flow to service debt principal and interest.
>
> (6) The arrangement is structured so that foreclosure during the project's development is unlikely because the borrower is not required to fund any payments until the project is complete, and, therefore, the loan cannot become delinquent."

Previously, in November 1983, the American Institute of Certified Public Accountants (AICPA) Accounting Standards Executive Committee (AcSEC) issued guidance to members of the AICPA that was given in almost identical language. AcSEC advised that, if an ADC loan met the characteristics given above and "[i]f the lender will receive a majority of the expected residual profit from the project . . . , the lender should account for income or loss from the arrangement as a real estate investment. . . ." (Professional Notes, 1983, p. 53)

The Consequences and Difficulties of Classifying ADC Loans as Direct Investments

There are two consequences of defining ADC loans as direct investments. One is that these loans would be limited by the FHLBB's direct investment rule; this will be discussed below. The second is that fees and other income from ADC loans that are classified as "direct investments" could not be credited to revenue and, as a result, would not increase net worth. In fact, the loans would have to be written down to market values (presumably the values of the underlying assets), should these be lower than book values. And the association's share of the project's operating losses would have to be recorded as they are accrued. In constrast, under regulatory accounting principles (RAP), up to 250 basis points of fees received on loans made (or more if the association determines that the fees compensated it for current expenses) can be recorded as current income and net worth, and loans need not be written down unless it becomes clear that the borrower will default.

Application of the FHLBB's definition of direct investments appears to be less than straightforward. The FHLBB has claimed, *ex post*, that some failed SLAs should have classified bad and fraudulent loans as direct investments, while the associations' officers and external auditors insist that the assets in question were properly classified as loans. Only four such SLAs have been specifically mentioned by the FHLBB: Empire Savings and Loan of Mesquite, Texas; San Marino Savings and Loan of San Marino, California; Beverly Hills of Beverly Hills, California; and Sunrise of Lake Worth, Florida.[2] The weakness of the FHLBB's position can be observed from a brief analysis of these associations.

After naming these four SLAs, FHLBB Chairman Edwin Gray asserts that "[e]xcessive risk-taking in the form of direct investments significantly contributed to the demise of these institutions, most of which improperly accounted for many of the loans as acquisition, development, and construction (AD&C) loans." (Gray, 1985, p. 1) He further states that "in accounting for these transactions real estate accounting principles, not loan accounting principles, should have applied. . . . The institutions were also able to improperly record fee income which resulted in an overstated net worth position. . . ." (pp. 2-3)

But Chairman Gray also characterizes these associations as having been fraudulently operated. He reports that "[n]umerous indictments have been issued against individuals who received loans from Empire for falsifying loan applications about their financial condition. Most of these loans had been made to groups of investors who had been assembled by several developers who worked closely with Empire management." (p. 4) The Congressional investigation of Empire also identifies fraud as the principal cause of its failure. Thus the FHLBB's *Notice of Charges and Hearing* (January 6, 1984) that preceded the closing of Empire states: "Empire S&LA's assets consist primarily of *loans* secured by speculative condominium projects and land for similar projects. . . . Certain of these *loans* are subject to the unsafe and unsound practices described above, i.e., lack of records, lack of appraisals or deficient appraisals, and excessive *loans* to one borrower." (Empire Hearings, 1984, p. 389, emphasis added) The FHLBB's press release on Empire's closing (dated March 14, 1984) explains the causes of the failure as follows:

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[2] Empire and San Marino are the only SLAs named in the FHLBB's statement supporting its rules restricting direct investments and growth. (FHLBB, 1985C, p. 6900).

> The findings of a recent examination indicate that the association engaged in questionable *lending* practices, including the financing of speculative land *loans* and condominium construction projects. Real estate appraisals, artificially inflated by multiple land sales among a group of associated individuals, provided the basis for the questionable *loans*, which greatly exceeded the value of the underlying real estate security. In many cases, the excess of the *loan* amount over the real value of the property was used to cover all *loan* fees and closing costs and to pay an incentive bonus to *borrowers* just for signing the *loan* papers. Often these *borrowers* were not required to make a down payment or contribute any of their own funds. (Empire Hearings, 1984, p. 185, emphasis added)

Except for a prior statement about brokered deposits, this is the entire explanation for the failure given in the release.

Gray also characterizes San Marino, Beverly Hills, and Sunrise as fraudulently managed. He states that "[t]he 1983 examination reports on San Marino revealed numerous violations of the Bank Board's *loan*-to-one-*borrower* limitation, substantial violations of the regulations governing proper *loan* underwriting, and a significant number of non-conforming appraisals on a series of *loans* made by the institution. . . . [In addition to other violations of law], [c]ertain officers and directors received a $600,000 *loan* from the association's largest borrowers." With respect to Beverly Hills, Gray states that "instances of potential or actual conflicts of interest, wrongdoing, or negligence by a number of persons have been noted." Sunrise's "insolvency was caused chiefly by extremely poor underwriting practices, which included deficient appraisals for many large AD&C *loans*, which are now nonperforming. . . . [Information also was received] concerning fraudulent activities of certain major *borrowers* of Sunrise." (quotations from Gray, 1985, p. 4 emphasis added)

In contradistinction to fraud (which a redefinition of direct investments would not cure), there is evidence that the associations' managers and public accountants believed that they had properly classified the loans in question as loans. Empire's former chairman states: "Almost all the loans that we made involving land were already made at the time the accountants got into that fight. The accountants got into that fight among themselves, and I would say to [Texas Savings and Loan Commissioner] Bowman or to anyone else, we have got loan documents, we think they're loans, the people owe us the money, they think they're loans." (Empire Hearings, 1984 p. 169) Significantly, Beverly Hills' CPAs, Touche Ross & Co, testified that the association's ADC loans should not have been and should not be classified as direct investments.[3] With respect to Sunrise, Lamar Heath, Director of Examinations for the Federal Home Loan Bank of Atlanta, stated: "Discussions with DH&S [Deloite, Haskins and Sells, Sunrise's certified public accountants] audit personnel during examinations indicated that DH&S did not want to consider any loans as investments and, to this date, the firm has not so classified even one investment unless it has been since Sunrise's failure."[4] (Heath, 1985, p. 6) (These conclusions by the CPAs were made after the November 1983 "clarification" by the AICPA.)

It should be noted that the FHLBB's examiners and supervisory agents have the legal right and responsibility to require insured SLAs to reclassify assets and liabilities that the FHLBB believes are misclassified.[5] To my knowledge, during and after the examinations that preceded their failures, the associations in question were never required to reclassify loans as direct investments.

One reasonable interpretation of the controversy is that, after the associations failed, the FHLBB wishes they had classified bad and fraudulent loans as direct investments, because, had they done so, the associations would not have been able to "disguise" their poor financial conditions by recording up-front fees as immediate income and increases of net worth. The House Committee on Government Operations, in its report on the failure of Empire, points to the inability of the FHLBB to see through the accounting, as follows:

> So long as the association showed steady earnings and high net worth, the regulators would not bring a cease and desist proceeding or other supervisory or regulatory action. The association would continue to show high earnings and net worth if it took fees and points on its real estate activities up front, simply because it characterized these activities as loans rather than investments. (Committee on Government Operations, 1984A, p. 32)

Similarly, the Director of Examinations of the Federal Home Loan Bank of Atlanta (Heath) testified (1985, p. 6) that had DH&S "properly classified a significant amount of Sunrise's lending as investments, rather than as loans, Sunrise would have been precluded from taking many millions of dollars in self-generated, non-cash income into its financial statements as loan interest and fees. As real estate investment, no income could have been earned until the property was sold. . . .''

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[3] In response to a question from Congressman Wyden ". . . how then was the judgment made that these transactions should be accounted for as loans?" Joe Burns, National Director, Accounting and Auditing Standards, Touche Ross & Company responded: "Because, for two factors. Number one, they were existing properties with existing cash flows, and so were not technically ADC loans; though, clearly, they had characteristics of ADC loans. Number two, the cross-collateralization agreement provided a significant call on the equity of J.D. Stout Company [the borrower], and accordingly in our judgment justified the company's belief that loan accounting was appropriate." (Burns, 1985, p. 135)

[4] I was unable to find any statements about San Marino's accounting.

[5] FHLBB General Counsel, Norman Raiden, testified: "If our examiners find that there is improper accounting, then we can require that the accounting be corrected, and if it's not, if the practice could lead to a substantial dissipation of assets, then we can issue an immediate cease-and-desist order." (Empire Hearings, 1984, p. 139)

The issue, then, should be posed as incorrect accounting for income rather than misclassification of assets. The FHLBB wants to define all high-risk (low-borrower-equity) ADC loans as direct investments so that SLAs cannot record income until it is realized. The solution would seem to be a rule requiring GAAP accounting for all assets, or, better yet, market-value accounting for all assets and liabilities. However, that is not the way the issue has been framed. Rather, the FHLBB has enacted a rule limiting SLAs' holdings of a particular asset for which market-value accounting is required—direct investments—and then has attempted to define high-risk, low-borrower-equity ADC loans as direct investments. But, as the citations to the practices of public accountants and FHLBB examiners indicate, such loans can be structured to fall outside the criteria for ''direct investments.''

In any event, the FHLBB has not required SLAs to report high-risk, low-borrower-equity ADC loans; to my knowledge, these data do not exist. Rather, the data used for research relating to the FHLBB's direct investment rule (whether by its staff or for the present study) are limited to ''real estate investments held for development/investment/resale'' and ''service corporation subsidiaries: equity investment.''

B. Legal Limitations on Direct Investments

Federally chartered associations have been prohibited from holding equity investments in real estate (other than for business premises) or equity securities, and investments in service corporations are limited to three percent of assets. The permissible limits for state-chartered SLAs vary considerably. Equity securities may not be held by SLAs in thirty states. Fourteen of these also prohibit equity interest in non-business-premise real estate. An additional two states prohibit equity investments in real estate but not in securities. Among the other eighteen states, all but one (West Virginia) permit investments in service corporations.

One state (Nebraska) imposes no dollar limits on any type of direct investment; two states (California and Wisconsin) have no dollar limit on real estate or service corporation equity, but limit or prohibit SLAs from holding equity securities. Two states (New Jersey and North Dakota) have no dollar limit on equity investments in real estate but limit other types of direct investment. The balance of the states permit SLAs to invest varying proportions of their assets and/or equity in direct investments.

The states permitting SLAs to invest the highest percentages of their assets in some or all types of direct investments (in addition to Nebraska, California, Wisconsin, New Jersey, and North Dakota) are Oregon (30%), Missouri (no dollar limit on equity securities, 20% for service corporations, and 10% for real estate), Florida (20% for service corporations and 10% for real estate), Arizona (10% for real estate and equity securities, and 6% for service corporations), Ohio (15% for service corporations and 10% for equity securities), Utah (20% for service corporations, 10% for real estate and equity securities, and 5% for equity securities), Mississippi (10% for service corporations and 15% for equity securities), New York (15% for equity securities, 12% for service corporations, and 5% for real estate), and Texas (10% for service corporations, equal to equity for real estate). Many of these states require approval by the state supervisor for specific investments and permit the supervisor to extend the limits.

In October 1984, the FHLBB proposed a regulation that would severely restrict the ability of FSLIC-insured state-chartered SLAs (which includes SLAs in almost all states, with the principal exception of Massachusetts) to make and hold direct investments. This rule, adopted on January 31, 1985 and effective on March 21, 1985, limits direct investments to the greater of 10 percent of an insured association's assets or twice its regulatory net worth, unless it has the prior written approval of its FHLBB Principal Supervisory Agent. (FHLBB, 1985B) As noted above, direct investments include ADC loans that are determined to be, in essence, equity investments.[6] The rule has a sunset procedure: it expires automatically on January 1, 1987.

C. The FHLBB's Evidentiary Support for Limiting Direct Investments

Direct Investments and Support of Housing

The FHLBB supported its limitation of direct investments by reference to two issues, one of which is its "concern that excessive direct investments may be contrary to the statutory goal of ensuring the availability of economical home financing." (FHLBB, 1985B, p. 6918) This concern is supported by a study showing "that the average institution with direct real-estate investments in excess of 10 percent of assets placed less than 25 percent of its loan funds into one-to-four family mortgages, while all other institutions placed over twice as much, almost 57 percent, in such mortgages." (p. 6919, reference to McKenzie, 1984) The study referenced used data for only the first quarter of 1984. The FHLBB has not made public any study of data from a longer time period, nor has it granted my request for data on mortgages made by institutions so that I could analyze the issue. In an earlier study (Benston 1984C, Tables 2-5 and Charts 4-5), I found, in contrast to the FHLBB's assertion, a positive association between increases in mortgages outstanding on one-to-four-family homes and the percentage of an association's direct investments to total assets at SLAs in general and disaggregated by asset size. (However, the proper measurement would be dollars of mortgages made).

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[6] Direct investments do not include stock in the Federal Home Loan Bank, the Federal Home Loan Mortgage Corporation or other corporations created pursuant to Title IX of the Housing and Urban Development Act of 1968, stock issued by an open-ended management investment company that invests in mortgage-backed obligations, and real estate acquired by foreclosure or used primarily for ordinary operations. Equity securities are limited principally to stock listed on the New York or American Stock Exchange or quoted on the National Association of Security Dealers Automated Quotation System, and an association's investment is limited to 25 percent of any one class of outstanding equity securities. Real estate investments are further limited by diversification rules.

In any event, the Committee on Government Operations (1985, p. 17) put the Bank Board's concern into proper perspective when it drew the following conclusions (quoted in their entirety):

> a. Secondary mortgage markets currently provide an assured source of mortgage credit for home purchases, and this supply of credit will flow freely into all local markets where the thrift institutions are active in reselling their loans through the standard secondary market procedures. Increased direct investments will not affect thrifts' ability and incentive to originate home mortgage loans for resale in this manner, and therefore should not materially alter the availability of home mortgage credit.
>
> b. The availability of home mortgage funds in a given market area does not depend on the mortgage lending behavior of any one or a few individual institutions but on the existence of active competing suppliers anywhere in the market. Statistical findings that certain thrifts with active direct investment programs are not originating many 1-4 family mortgages do not demonstrate that direct investments have an adverse effect on the availability of home mortgage funds, because such findings do not consider whether other institutions in the same market may be increasing their lending activity to compensate.
>
> c. Direct investments by thrifts in residential real estate may contribute to reduced housing costs through lower financing costs for developers.
>
> d. For these reasons, regulatory restrictions on direct investments by thrifts can not be justified on the basis of any supposed need to assure the availability of mortgage credit. Such restrictions

may, on the contrary, inhibit a beneficial reduction in general housing costs.

Direct Investments and Risk to the FSLIC Fund

The other reason given by the FHLBB for restricting direct investments is actually-experienced and potential costs to the FSLIC fund. In its 1985 supporting statement, the FHLBB states that it ''has engaged in considerable research to evaluate the nature of the risk of direct investments to institutions and to the FSLIC fund. Those studies demonstrate that a greater proportion of direct investments increases the risk of loss to them and the FSLIC fund.'' (FHLBB, 1985B, p. 6915). The studies referred to are by McKenzie (1984A and 1984B), Edwards (1984), Crocket, Fry, and Horvitz (1984), Sirmans (1984A and 1984B), and Quinn et al. (1984, hereafter referred to as ''SRI'').[7] In addition, the FHLBB claims that its ''supervisory experience also confirms the theoretical and empirical demonstrations of the relatively riskier nature of direct investments set forth in the cited studies.'' (FHLBB, 1985B, p. 6915). The only supporting evidence put forth for this latter assertion is two memoranda by Schilling (1984 and 1985).[8]

McKenzie and Edwards studied and Schilling and Crocket, Fry and Horvitz described the actual behavior of SLAs, while Sirmans and SRI constructed hypothetical analyses using proxy data. The former studies are reviewed and additional empirical analyses are presented at this point. The Sirmans and SRI studies are reviewed below.

Schilling (1984 and 1985) gives a very brief description of the growth, problems, losses, and net worth at 26 unnamed SLAs plus Empire (Texas) and Manning (Illinois). Most of the associations are described as growing rapidly, making risky and occasionally rule-violating ADC loans on which losses were taken and which greatly reduced or eliminated net worth. Direct investments are said to have been involved in 15 of the cases, although few of the descriptions actually mention direct investments except as ADC loans that *ex post* are considered to be direct investments. The Committee on Government Operations Report (1985, pp. 28-31) reviews this material and rightly concludes that ''it is impossible to determine to what extent earlier implementation of the Bank Board's net worth and ADC loan accounting rules, together with more thorough and timely examination and supervision activity, would have effectively controlled these excesses without any need for a direct investment rule." (pp. 28-29).[9]

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[7] An earlier FHLBB staff study, Crockett and King (1982) that studied direct investments in Texas, is not referenced.

[8] The Committee on Government Operations Report (1985, p. 28) states that ''[t]he Bank Board did not compile and release a set of case studies of such problem institutions in support of the regulation, in spite of the committee's request for such information as background material for the February hearing, but some limited descriptive information on the direct investments of several recent problem cases has subsequently been supplied to the subcommittee.'' This information is the Schilling memos.

Crockett, Fry, and Horvitz (1984) interviewed managers of Texas saving and loan associations about their experience with equity participation loans. They report that developers would want to retain equity in their best projects, from which the FHLBB concludes that the projects in which an SLA participates necessarily are risky. They also describe how SLAs limited their risk with legal arrangements and monitoring and report that, thus far, the equity participation projects have been profitable on the average. In any event, the study does not report on direct investments defined as assets that are owned by SLAs.

McKenzie (1984A) compared for SLAs their holdings, as of June 30, 1984, of selected assets and liabilities to their holdings of direct investments. "Direct investments" necessarily includes only those amounts classified as direct investments on the statements filed by SLAs with the FHLBB, because these are the only data available. The purpose of the exercise was to determine whether the mean percentages of each selected asset and liability to total assets or total liabilities differed statistically according to the percentage of direct investments to total assets. Among SLAs with over five percent of total assets in direct investments (the lowest percentage considered) compared to SLAs with lower percentages, McKenzie reports statistically significantly (.05 level) greater holdings of ADC loans, construction loans (which, being several times greater than ADC loans, would seem to be another category), non-residential mortgages, short-term assets, jumbo CDs, brokered deposits, and federal home loan bank advances. Significantly higher rates of total asset growth also are reported for SLAs with relatively higher percentages of direct investments. SLAs with over five percent direct investments to total assets (as of June 30, 1984) compared to those with lower percentages also had significantly lower holdings of investment securities, mortgages and mortgage-backed bonds, and passbook savings.

McKenzie does not give statistics for marginal increases in direct investments but only compares the assets and liability percentages for SLAs above and below a specified percentage of direct investments. However, from these tables, one can calculate that the ratios do not increase monotonically with increases in direct investments but increase inconsistently, as follows (all figures are mean percentages of total assets or, for brokered deposits, total liabilities):

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[9] The Report states that "the committee does not accept the Empire case as an instance that supports the need for the direct investment rule." (p. 29) San Marino is dismissed similarly as an example because, "as in the Empire case, there were substantial other problems besides just the risk taking inherent in direct investments [assuming that their ADC loans were direct investments], and the question must be raised whether this case supports the need for the direct investments rule or merely for stronger supervision." (p. 30)

Direct Investments	ADC Loans	Construction Loans	Brokered Deposits
5%-10%	7.56%	16.60%	11.30%
10-15	7.40	19.93	12.60
15-20	7.64	13.37	24.35
20-25	9.77	21.36	13.82
25+	4.54	12.29	28.93

Whether the differences are statistically significantly different from each other cannot be determined from the data presented.

Neither McKenzie nor the FHLBB provides any evidence or argument supporting the hypothesis that the assets and liabilities selected are indicators of risk, nor has the FHLBB proposed regulations that would limit these assets and liabilities, except for brokered deposits. In fact, McKenzie reports that a generally accepted measure of risk exposure—delinquent loans—is not significantly different at SLAs with varying percentages of direct investments.

McKenzie (1984B) presents tables giving the percentages of selected assets and liabilities to total assets and liabilities as of June 30, 1984 aggregated by growth rates of total assets between June 30, 1983 and June 30, 1984 above and below the mean rate. Only direct investments in real estate are included (service corporation equity was not examined). The FHLBB interprets these tables as showing that direct investments are risky, because SLAs with over 10 percent of their assets in real estate direct investments hold what the FHLBB asserts are riskier assets and liabilities and grow at faster rates than the mean. This interpretation is essentially tautological, because the FHLBB has not demonstrated that the assets and liabilities specified and growth, as such, provide meaningful measures of risk.

Edwards (1984) calculates the rates of return on the service corporation equity portion of direct investments at 1124 SLAs over the five-year period 1979-83. He excludes observations with negative or zero asset balances or zero net income in a semi-annual reporting period, or less than three years of returns. With each SLA as an observation, he finds returns that have both relatively high mean and range. The FHLBB concludes that "[t]his large dispersion . . . suggests that the Board is correct in proposing to require an additional reserve requirement for institutions engaging in these riskier investments.'' (FHLBB 1985A).

Edwards' study suffers from several important shortcomings. First, it excludes direct investments in real estate. Though service corporations' assets do typically include real estate (Edwards reports that as of December 31, 1984, 31 percent of their total assets were in real estate), direct real estate investments make up another substantial portion of the direct investments to which the FHLBB's rule pertains and which therefore deserve examination. Second, the returns from service corporation equity direct investments were not combined with the returns from other assets to determine the SLAs' total portfolio variance of returns. In addition to important limitations of the variance of returns as a measure of risk appropriate for the FSLIC, the variance of returns from an individual asset alone has no meaning (as is discussed below). Third, each SLA was taken as an equally weighted observation without regard to the dollar amount invested in service corporation equity.

Conclusions with Respect to the Studies on Which the FHLBB Relies

The Schilling (1984 and 1985) and Crocket, Fry, and Horvitz (1984) papers, which refer to ADC loans that might be classified as direct investments, are based on anecdotal reports of a limited number of unnamed institutions. It may be that these institutions and others took excessive risks and/or perpetrated frauds that might result in charges against the FSLIC fund. From the Schilling memoranda there is no way to distinguish among the causes of the listed SLAs' problems, with the exception that almost all the references are to ADC loans rather than to owned direct investments. The descriptive paper by Crocket, Fry, and Horvitz indicates only that *some* of the Texas SLAs made very risky investments and that small SLAs that invest a substantial proportion of their assets in equity-participation ADC loans would be unlikely to hold geographically diversified portfolios. Consequently, the authors can conclude only that ''real estate equity participation *per se* will not produce the kinds of beneficial results for financial institutions that proponents envision. . . . If thrifts are to become more involved in equity investment in real estate, an effort should be made to insure that projects are chosen not only on the basis of the riskiness of the individual investment, but on the basis of its contribution to the risk of the portfolio as a whole.'' (p. 495) The McKenzie (1984A and 1984B) and Edwards (1984) papers employ statistical analysis, but suffer from very severe shortcomings, as described previously.

D. Overview of Empirical Studies of the Return and Risk on Direct Investments

Because of the shortcomings of the papers presented by the FHLBB in support of its rule restricting direct investments, several additional studies of direct investments at SLAs were undertaken and are presented next. The first study examines the returns and risk on direct investments made by SLAs. Returns are measured on direct investments, other assets, and total assets over the three years ended June 30, 1984. Risk is measured in six ways. One is by the standard deviation of the total assets with and without direct investments included. The second is by negative returns, because losses to the FSLIC result from downside rather than from total risk. Third, the hypothetical analyses presented by Sirmans (1984A and B) and SRI (1984) are corrected. Fourth, the change in net worth associated with direct investments is measured because the hypothetical analyses do not consider the present financial condition of SLAs. Fifth, the relationship between direct investments and the assets the FHLBB defines as excessively risky is measured. The sixth risk analysis is evidence additional to that presented in Chapter 1 of the relationship between direct investments and failures.

E. Data Used for the Empirical Studies

Source and Exclusions

Source. Balance sheet and income statement numbers, as reported semi-annually to the Federal Home Loan Bank Board by insured SLAs over the three years ended June 30, 1984 were used for the empirical studies.[10] The numbers taken were the means of the seven balance sheet amounts (June 30, 1981 through June 30, 1984) and the algebraic sum of six income statement amounts. The relatively long period was chosen to reduce noise, because income from many direct investments is not booked early, while expenses tend to be recorded early and discontinuously. A three year period was considered the longest that could be used, since direct investments are a fairly recent development for many saving and loan associations.

Exclusions. Only SLAs with positive or zero direct investment balances reported in each of the seven semi-annual balance sheets were included in the sample. (Those that reported losses or no net income were not excluded.) SLAs that began operations or made direct investments over less than the three year period were excluded.

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[10] The data had been put into machine-readable form by Cates Consulting Analysts, Inc., who further processed the data according to my instructions.

Of the 3139 SLAs with financial statements filed on June 30, 1984, 159 (five percent) were excluded because they began or ceased operations as savings and loan associations within the three year period (plus one that didn't file some reports). An additional 603 (19 percent) were excluded because they reported incomplete or negative direct investment balances during the period. Because these 603 exclusions could bias the results, the characteristics of these observations were examined.

Tests for Selection Bias. As shown in Appendix Table A1 which reports the data disaggregated into small (assets less than $100 million) and large (total assets of $100 million and above) SLAs, 13.1 percent of the 603 excluded SLAs had negative returns (net loss or profit before tax divided by average assets) on direct investments, 40.3 percent had positive returns, and 46.6 percent had zero returns. Returns of more than ten percent are reported as negative for 5.0 percent of the sample and as positive for 13.3 percent of the sample. (Other breakdowns are given in Table A1.) The exclusions yield similar data for small and large SLAs, except that the small SLAs have relatively more zero-return direct investments and the larger SLAs have more positive-return direct investments. SLAs with direct investments greater than one percent of total assets are 20.3 percent of the negative and 22.2 percent of the positive returns. Nine (1.5%) of the excluded SLAs held more than five percent of their assets in direct investments, and six of the nine had positive returns. Thus more excluded observations have positive returns on direct investments.

Table A2 provides an analysis of the reasons for exclusion, by negative and positive returns and by size of SLA. The percentages for the small and large SLAs are similar, particularly for the sign of the returns. Most (55%) of the excluded observations had no direct investments in past (prior to June 1984) periods. About 11 percent reported data only for the earlier six month periods. Negative asset balances in some periods were reported for only 5.1 percent of the overall negative and 3.3 percent of the overall positive net earnings observations. Thus the reasons for incomplete reporting and negative asset balances do not appear to be very different for direct investments yielding incomplete negative or positive returns. In particular, the excluded SLAs appear to be those that were more recent rather than unsuccessful direct investors.

Overall, if there is a bias in the data analyzed, it appears to be an under-representation of positive yielding direct investments.[11]

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[11] Edwards (1984) provides no analysis of excluded observations.

The Sample Analyzed—Numbers and Limitations

The sample consists of 2377 observations. Of these, 588 (25 percent) reported no direct investments.[12]

The accounting data used for the study suffer from some possibly important limitations. Direct investment expenses are understated since they do not include the opportunity cost of funds or, for most SLAs, allocations of overhead. However, interest on real estate projects that is incurred during construction usually is capitalized and thus is included in the direct investment asset amount rather than as an expense. Income from direct investments also is understated. Decreases in the market value of the investments are supposed to be charged as current-period expenses (losses) and the assets reduced (credited) when the decreases are believed to be other than temporary, even though the assets were not sold. However, increases in market value are not recorded until a sale of the asset takes place. Furthermore, capital gains and losses from direct investment and foreclosed real estate were not segregated before the reporting form was revised in 1984. An analysis of these accounts (profit on the sale of real estate owned and provision for losses and losses on sale of real estate owned) reveals that gains tend to exceed losses. Were the balances in these accounts added to net income from direct investments, the mean returns from direct investments would be higher (multiplied) by the following percentages:

Direct investment of $0 < 1$ percent of total assets	119%
Direct investments of $1 \leq 5$ percent of total assets	110
Direct investments of $5 \leq 10$ percent of total assets	158
Direct investments of 10+ percent of total assets	106

These account balances were not included with direct investment net income but were added to net income from other assets. Thus it is not clear whether, on balance, the net returns from direct investments are biased up or down.

Net income from other assets, primarily mortgages, is also measured with error. Capital losses resulting from interest rate increases are not recognized in SLA accounts unless the assets are sold. But even when they are sold, the FHLBB's regulatory accounting principles (RAP) permit SLAs to carry the loss as a part of net worth and then to charge it off as an expense over time. While capital gains from decreases in interest rates are not recognized unless the assets are sold, SLAs with low levels of net worth and tax-loss carryfowards have incentives to sell these assets to record (book) gains. Mortgagors also have incentives to incur a charge (which is income to the SLA) to repay or refinance their mortgages when significant decreases in interest rates occur. For these reasons, net reported income from other assets tends to be overstated.

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[12] Thirteen SLAs with direct investments of $1,000 or less were classified as zero direct investments. Four of these would have shown returns of from +102 to +783 percent; the balance reported zero net income. Two additional SLAs were excluded from the analyses of return and risk because their particularly low and high returns on other investments would invalidate the statistical tests of significance. The returns on these observations are reported in Table 1. Their exclusion has virtually no effect on the direct investment returns reported.

F. Returns on Direct Investments and Other Assets

General Description

Most (79%) of the 2375 SLAs had less than one percent of their assets in direct investments (26 percent of the total had none). Direct investments of from one to three percent of assets were held by 364 (15 percent) of the SLAs, forty-four had from 5 to 10 percent (2 percent), and only fifteen (0.6 percent) had more than ten percent on average over the three-year period.

Table 1 shows the medians, means, and standard deviations of the before income tax returns on direct investments and other assets, aggregated according to the following percentages of direct investments to total assets: 0 <1%, 1 <3%, 3 <5%, 5 <10% and 10% and above. The data also are aggregated by the following five asset sizes (as of June 30, 1984) to measure the presence of size-related differences: (1) all 2375 SLAs; (2) 1214 SLAs with assets under $100 million; (3) 1161 SLAs with assets of $100 million and over; (4) 1005 of these SLAs with assets of $100 million to $1 billion; and (5) 156 SLAs with assets of $1 billion and above.

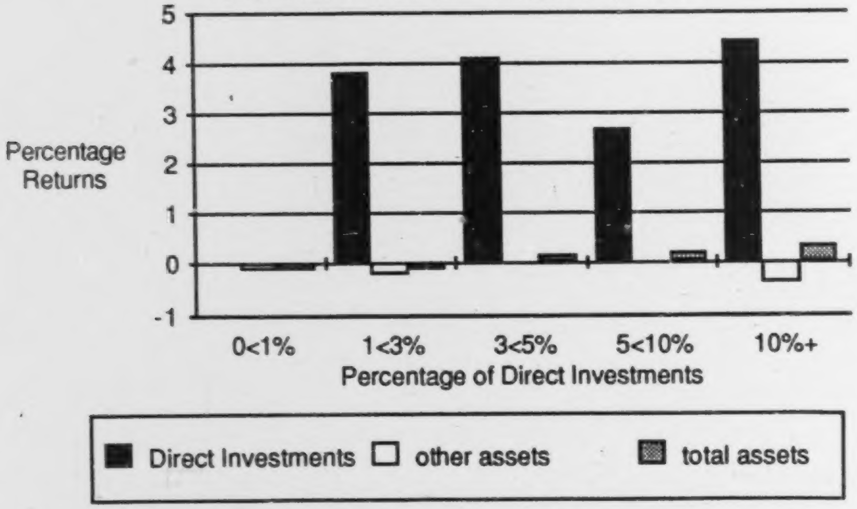
Returns

The average returns on direct investments for all of the asset size groups are considerably above the returns on other assets, as shown on Table 1 and Chart 1. For the 506 SLAs with one percent or more of their assets in direct investments, the average return is +3.75 percent. These SLAs averaged −0.16 percent on their other assets. With direct investments included, these SLAs averaged a return of −0.04 percent. As Table 1 and Chart 1 show, the total return on assets increases as the percentage of direct investments increases, from −0.13 percent for SLAs with from one to three percent direct investments, to +0.23 for SLAs with from five to ten percent of direct investments, and +0.34 percent for SLAs with over ten percent. These differences are statistically significant at the .01 level or greater. Thus, without direct investments, the average SLA would have had negative returns.

These results are consistent with those reported in a FHLBB study by Crockett and King (1982) of Texas SLAs (not cited by the FHLBB, 1985B). They regressed 1981 net profits on individual asset and liability balances, all divided by total assets. Compared to returns on other, traditional assets, they found significantly higher net profits for the direct investments of real estate held for development (16.21%), though not for service corporations (1.57%). In comparison, they estimated a return for conventional mortgages of 11.06 percent.[13]

Returns on direct investments and other assets may not be correctly measured, particularly as between types of assets, as noted above. However, the net returns on total assets, given in Table 1 and Chart 1, do not suffer from this measurement problem. These data show statistically significantly higher returns for most size categories at SLAs that hold over three percent of their assets in direct investments. (The returns are higher, but not significantly so, for SLAs with over $1 billion in assets.) Thus, the data indicate that direct investments significantly improve the reported net returns to SLAs.

CHART 1
Mean Returns—All Associations
Over Three Years Ended June 30, 1984



G. Risk—Portfolio Analyses

Finance theory holds that efficient portfolios of assets (and liabilities) can be formed to yield the maximum (expected) returns given a specified degree of risk, where risk is measured by the standard deviation of returns.[14] The return of the portfolio is simply the weighted sum of the returns of the individual assets. The standard deviation of a portfolio is a similarly weighted sum of the standard deviations of the individual assets plus a term that depends on the covariance of returns. Where asset returns are perfectly correlated, the standard deviation of the portfolio is, like the portfolio return, simply a weighted sum of individual asset standard deviations; the dispersion of the returns would not be reduced by combining such assets into a portfolio. However, where the returns are less than perfectly correlated, or better, negatively correlated, the portfolio's standard deviation (the measure of risk) can be reduced considerably.

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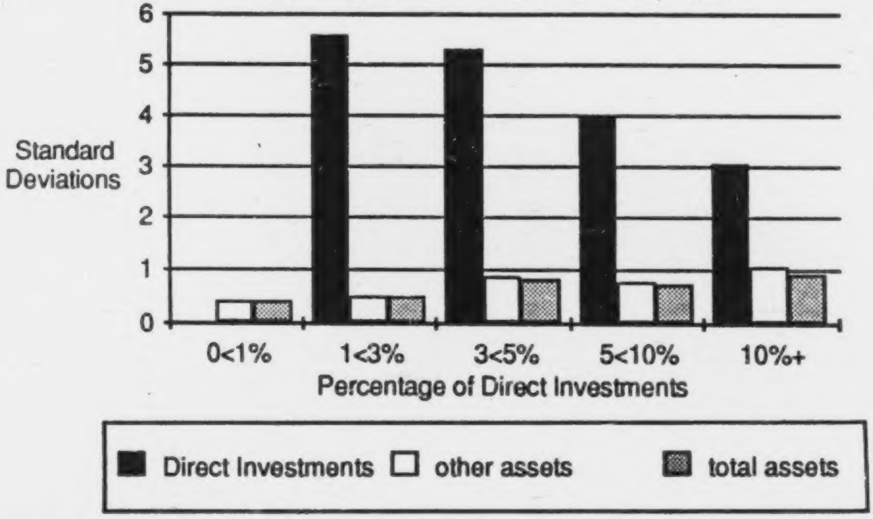
[13] Edwards (1984) reports a mean rate of return for equity investments in service corporations of 17.4 percent.

The data presented in Table 1 and Chart 2 speak directly to this measure of risk. Though the standard deviations of returns on direct investments were greater than the standard deviations of the returns on other assets, the combination resulted in lower total-asset-return standard deviations for SLAs with over three percent of assets in direct investments. This finding holds for all three asset sizes of SLAs. Furthermore, the standard deviations of direct investments decreases as the proportion of direct investments increases. For all SLAs, the standard deviations decrease from 5.57 for those holding three to five percent of their assets in direct investments, to 3.05 for those holding over ten percent. The higher total-asset-return standard

CHART 2

Standard Deviations of Returns—All Associations
Over Three Years Ended June 30, 1984



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[14] One of the earliest descriptions of the theory is given in Markowitz (1952). Also see Sirmans (1984A) or almost any textbook on investments.

deviations for SLAs holding higher proportions of direct investments shown in Chart 2 are due entirely to those SLAs' relatively higher other-asset-return standard deviations. Thus, risk, as measured by the standard deviation of returns, is reduced by direct investments.

Risk—The Distribution of Returns

The standard deviation is an inadequate measure of risk for the FSLIC, since the agency is liable for negative returns beyond those covered by net worth, while it benefits from positive returns only to the extent that net worth is increased and, hence, future probability of bankruptcy is decreased. Moreover, positive returns with a wide range increase the standard deviation but do not increase risk. Therefore, the distribution of the returns is analyzed.

Table 2 presents the distribution of direct investment returns in five percentage-point aggregates, in terms of numbers and percentages.[15] The table shows that the range and standard deviations of the returns decrease substantially as the percentage of direct investments to total assets increases. None of the SLAs with direct investment percentages of from five to ten percent has returns less than −5 percent or greater than +15 percent. The fifteen SLAs with direct investments of over ten percent had only positive returns of between five and fifteen percent.

Table 3 presents the returns on direct investments aggregated by the total amount invested.[16] These data show that it is the smaller (under $500,000) total investments that have the greater range of returns. The standard deviations once again vary inversely with the amount of direct investments, decreasing from 10.00 and 13.89 for total investments of under $100,000 and between $100,000 and $500,000, to 7.42 and 5.31 for total investments between $500,000 and $1 million and above $1 million. Investments below $100,000 in total are reported to have a disproportionately higher percentage of zero returns (52.4 percent of the observations, compared to 7.7 percent for the $100-to-$500 thousand group and 0.6 percent for the $1 million-plus group). Investments above $500,000 have very few returns below −15 percent and above +20 percent. These data indicate that SLAs with larger portfolios of direct investments pose *less* risk to the FSLIC.

Because negative returns are a more important measure of the downside risk to the FSLIC than the variance of returns, these data are analyzed in greater detail. Table 4 presents the distribution of negative returns on direct investments, broken down by the percentage of direct investments to total assets and, within these groups, by the amount of the investment. In particular, Table 4 shows that 70.9 percent of the negative returns are concentrated at SLAs with one

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[15] The two observations excluded from the previous analysis are included here because their returns on direct investments would not bias the results. See footnotes a and b to Table 1 for the returns and compare the means and standard deviations in Table 1 with those given in Table 2.

[16] The number of observations is greater than the number shown on Table 2 since that table includes only direct investments greater than one percent of total assets.

TABLE 2

Direct Investments—Distribution of Returns per Year, Average of Three Years Ended June 30, 1984
By Percentage of Direct Investments to Total Assets
508 Savings and Loan Associations with at Least One Percent of Assets in Direct Investments

Percentage Returns On Direct Investments	Percentage of Total Number By Direct Investments to Total Assets			Number of SLAs By Direct Investments to Total Assets		
	1% to 5%	5% to 10%	10% Plus	1% to 5%	5% to 10%	10% Plus
−15>−20	0.2			1		
−10>−15	0.4			2		
− 5>−10	2.9			13		
0>− 5	12.7	15.9		57	7	
=0	1.6	2.3		7	1	
0< 5	47.2	50.0		212	22	
5<10	25.8	25.0	53.3	116	11	8
10<15	6.0	6.8	46.7	27	3	7
15<20	2.2			10		
20<25	0.2			1		
25<30	0.2			1		
30<35						
35<42	0.4			2		
Totals	100.0	100.0	100.0	449	44	15
Summary						
−20<0	16.3	15.9	0.0	73	7	0
=0	1.6	2.3	0.0	7	1	0
0<42	82.2	81.8	100.0	369	36	15
Median				3.58	2.67	3.37
Mean				3.84	2.65	4.25
Std. Dev.				5.51	4.01	3.01

TABLE 1

Returns on Direct Investments, Other Assets, and Total Assets—Averaged Over Three Years Ended June 30, 1984
2375 Savings and Loan Associations (SLAs) with Either No or Some Direct Investments in Each
Semiannual Reporting Period by Percentage of Direct Investments to Total Assets

Direct Invest. Percentage	No. of SLAs	Medians			Means			Standard Deviations		
		Direct Invest.	Other Assets	Total	Direct Invest.	Other Assets	Total	Direct Invest.	Other Assets	Total
All 2375 SLAs										
0<1%	1869	[1]	–0.17	–0.13	[1]	–0.13	–0.12	[1]	0.39	0.40
1<3%	364	3.52	–0.21	–0.14	3.78	–0.20	–0.13	5.57	0.48	0.49
3<5%	84[a]	3.91	–0.12	0.08	4.10	–0.02	0.13**	5.28	0.86	0.83
5<10%	44	2.67	–0.11	0.39	2.65	–0.01	0.23**	4.01	0.79	0.72
10%+	14[b]	3.37	–0.22	0.23	4.42	–0.41	0.34*	3.05	1.05	0.94
1214 SLAs with Assets under $100 Million										
0<1%	1087	[1]	–0.09	–0.09	[1]	–0.09	–0.09	[1]	0.42	0.43
1<3%	92	3.5	–0.19	–0.11	3.39	–0.18	–0.11	6.29	0.59	0.58
3<5%	23	3.91	0.08	0.13	3.30	–0.07	0.08*	4.15	0.50	0.47
5<10%	11	4.05	0.29	0.66	5.06	–0.02	0.31	4.25	1.10	1.01
10%+	1	5.63	–1.02	–0.14	5.63	–1.02	–0.14	—	—	—

1161 SLAs with Assets of $100 Million and above										
0<1%	782	[1]	–0.20	–0.19	[1]	–0.18	–0.16	[1]	0.37	0.36
1<3%	272	3.58	–0.21	–0.15	3.71	–0.21	–0.14	5.32	0.44	0.46
3<5%	61[a]	4.04	–0.16	0.03	4.13	–0.10	0.06*	5.64	1.19	1.16
5<10%	33	2.61	–0.17	0.34	3.18	–0.03	0.20**	3.88	0.67	0.61
10%+	13[b]	3.37	–0.18	0.84	4.33	–0.36	0.37*	3.15	1.09	0.97
1005 SLAs with Assets from $100 Million to $1 Billion										
0<1%	707	[1]	–0.20	–0.19	[1]	–0.18	–0.16	[1]	0.37	0.37
1<3%	221	3.37	–0.21	–0.15	3.57	–0.21	–0.14	5.58	0.46	0.47
3<5%	41[a]	4.18	–0.12	0.12	4.48	0.12	0.28**	6.35	1.12	1.09
5<10%	26	2.67	–0.11	0.36	3.49	–0.01	0.23**	4.14	0.62	0.59
10%+	10[b]	3.37	–0.18	0.84	4.39	0.39	0.85**	3.14	2.69	1.71
156 SLAs with Assets of $1 Billion and above										
0<1%	75	[1]	–0.25	–0.25	[1]	–0.22	–0.22	[1]	0.33	0.33
1<3%	51	3.98	–0.29	–0.16	4.30	–0.21	–0.14	3.97	0.37	0.40
3<5%	20	2.46	–0.17	–0.06	3.58	–0.27	–0.12	4.02	0.46	0.42
5<10%	7	2.06	–0.17	–0.09	2.01	–0.07	0.07	2.60	0.91	0.74
10%+	3	2.88	–0.22	0.04	3.27	–0.27	0.27	3.44	0.13	0.56

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[a] Excluding one SLA with the following returns: 1.28 –5.68 –5.41

[b] Excluding one SLA with the following returns: 1.78 8.22 5.32

[1] Not meaningful since SLAs with no direct investments are included.

* = Statistically greater than return for 0<1% group at the .05 one-tail level.

** = Statistically greater than return for 0<1% group at the .01 one-tail level.

TABLE 3

Direct Investments—Distribution of Returns per Year, Average of Three Years Ended June 30, 1984 by Total Amount of Direct Investment at Each Savings and Loan Association

Percentage Returns on Direct Investments	Percentage of Total Number By Amount of Direct Investments ($1000)				Number of SLAs By Amount of Direct Investments ($1000)			
	$1 to $100	$100 to $500	$500 to $1000	$1000 Plus	$1 to $100	$100 to $500	$500 to $1000	$1000 Plus
−35>−43	0.2				1			
−30>−35	0.4				2			
−25>−30	0.2		0.5		1		1	
−20>−25								
−15>−20	0.4	0.3	0.5	0.3	2	1	1	2
−10>−15	0.6	0.8	0.5	0.4	3	3	1	3
− 5>−10	1.6	2.6	4.9	2.7	8	10	10	19
0>− 5	4.8	13.6	14.6	14.5	24	53	30	100
=0	52.4	7.7	3.4	0.6	262	30	7	4
0<5	22.4	47.1	46.6	46.2	112	184	96	320
5<10	7.2	16.6	20.9	27.2	36	65	43	188
10<15	4.4	3.8	4.4	5.3	22	15	9	37
15<20	1.8	2.3	1.5	1.7	9	9	3	12
20<25	0.6	0.3		0.4	3	1		3
25<30	0.2	0.8	1.0	0.4	1	3	2	3
30<35	0.6	1.3			3	5		
35<40	0.6	0.8	1.0		3	3	2	
40<131	1.6	2.3	0.5	0.1	8	9	1	1
Totals	100.0	100.0	100.0	100.0	500	391	206	692
Summary								
<0	8.2	17.1	20.9	17.9	41	67	43	124
−10>−43	1.8	1.0	1.5	0.7	9	4	3	5
0>−10	6.4	16.1	19.4	17.2	32	63	40	119
=0	52.4	7.7	3.4	0.6	262	30	7	4
0<10	29.6	63.7	67.5	73.4	148	249	139	508
10<131	9.8	11.5	8.3	8.1	49	45	17	56
0<131	39.4	75.2	75.7	81.5	197	294	156	564
Median					0	2.12	2.56	3.52
Mean					2.77	5.28	3.37	3.76
Standard Dev.					10.00	13.89	7.42	5.31

percent or less of their assets in direct investments. Also, these SLAs had 76.5 percent of the negative returns below −5 percent (and 85.5 percent of the returns below −10 percent). Only 2.5 percent of the negative returns are in SLAs with direct investments of from five to ten percent, and none of the returns is lower than −3.0 percent.

Table 4 also presents the −5 to −1 percent returns in greater detail. It shows that these returns are closer to the zero end of the scale. Furthermore, the SLAs with greater percentages of direct investments have returns closer to zero. Thus, the negative returns on direct investments tend to be relatively small.

The distribution of returns data indicate that the greater variance and the negative returns about which the FSLIC might be concerned are concentrated in the smaller direct investments and at SLAs with under one percent, and certainly under five percent, of their assets in direct investments.[17] These data indicate that the FHLBB's regulation that limits direct investments to ten percent of total assets would tend to increase, rather than decrease, the risk to the FSLIC.

Returns and Risk in States with Liberal Direct Investment Rules

The FHLBB cites California, Texas, Florida, Ohio, and Arizona as examples of states that granted state-chartered SLAs liberal powers to make and hold direct investments. Therefore, the returns and risk of direct investments by SLAs in these states plus Louisiana were analyzed separately. Louisiana also has a liberal direct investment law and data on failures in this state are analyzed in Chapter I.

Table 5 presents the returns, standard deviations, and percentage of negative returns, aggregated by percentages of direct investments to total assets, of the SLAs in California, Texas, Florida, Ohio, and Louisiana that are included in the data presented previously for the entire country. (The findings for Arizona are consistent with those reported for the other states, but are not shown because only six SLAs had direct investments over the three years studied.) These data show similar results to those discussed above. Returns on direct investments are positive and increasing as the percentage of direct investments to total assets increases. The standard deviations of total assets generally are lower or but slightly higher with, as compared to without, direct investments. Direct investments yield proportionately fewer negative returns than do investments in other assets, a result that reduces the risk faced by the FSLIC.

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[17] It would appear that this is the reason for the relatively wider distribution of returns that Edwards (1984) reports and which the FHLBB cites. He did not disaggregate his data by size of direct investment or by percentage to total assets; each SLA's numbers were taken as an observation.

H. Hypothetical Estimates of Return and Risk

FHLBB Studies

Perhaps because of the limitations of accounting data, the FHLBB conducted or commissioned studies by Sirmans (1984A and 1984B) and SRI (1984) that attempt to determine the risk of direct investments to the FSLIC based on returns and risk of optimal asset portfolios for SLAs. These papers are reviewed first, then the shortcomings of the data and conceptual framework are pointed out briefly, and finally the analysis is redone in an effort to reduce those shortcomings.

Sirmans's Efficient Frontier Studies. The returns and risk of SLA investments (defined as the standard deviation of the returns) have been synthetically estimated by Sirmans (1984A). He attempted to construct a hypothetical SLA portfolio consisting of five assets: (1) fixed-rate mortgages, (2) adjustable-rate mortgages, (3) commercial loans, (4) common stock, and (5) real estate (4 and 5 serve as proxies for direct investments). A quadratic programming algorithm was used to determine efficient combinations of these assets.

The principal problem faced by Sirmans was obtaining measurements of the returns and standard deviations of the returns on these five types of assets. For this purpose, quarterly data over the period 1978 quarter 1 through 1984 quarter 2 (twenty-six observations) were obtained. The following measures were used as proxies for the assets in which SLAs were presumed to invest:

(1) fixed-rate mortgages (FRMs): The Bank of America's thirty-year constant-maturity series of fixed-rate mortgages;

(2) adjustable-rate mortgages (ARMs): the one-year U.S. treasury bill rate plus 250 basis points;

(3) commercial loans: the prime rate on short-term business loans;

(4) common stock: Standard and Poor's 500 Common Stock Index; and

(5) real estate: initially the Frank Russel Company (FRC) Property Index was used. Returns on a sample of real estate investment trust (REIT) shares were used for a later paper (Sirmans, 1984B) and in a similar study by SRI (1984).

Using the FRC Property Index as the proxy for quarterly real estate returns, Sirmans (1984A, Table 1) finds the maximum quarterly return (.033) for the minimum standard deviation (.0048) to be a portfolio consisting of 1.1% FRMs, 81.7% ARMs, 1.9% common stock, 15.3% real estate (or 17.2% direct investments), and no commercial loans. Thereafter, higher expected returns are obtained at the "cost" of higher standard deviations. FRMs and common stock drop out rather quickly, and real estate increases to 100 percent, to the point where the return is .036 and the standard deviation is .013.

Sirmans (1984B) recalculated the efficient portfolios by substituting quarterly returns on REIT shares for the FRC index. The FRC index is flawed, he states, because it is based on annually appraised values and includes only completed properties that are geographically dispersed across the United States. Hence, he asserts, the standard deviations are understated. The REIT-share returns that he used to reestimate the numbers are calculated from an average of the quarterly returns of from eight to fourteen REITs. However, the REITs' returns are only partially derived from direct investments. Sirmans reveals that the REITs "held, on average, 51% of their real assets in mortgages and 49% of real assets in real estate." (p. 3) He also acknowledges that tax and management considerations result in divergences between REIT returns and the returns from the real estate held. With the REIT proxy substituted for the FRC index, the lowest standard deviation (.005) is found for a portfolio of 0.1% FRMs, 96.5% ARMs, and 2.4% common stock, yielding a return of .032. A return of .033 and standard deviation of .006 are calculated for investments of 95.2% ARMs and 4.8% "real estate." Thereafter, increasing percentages of "real estate" yield higher returns and proportionately higher standard deviations until, at 100% "real estate," the return is .049 and the standard deviation is .092. The different percentages determined by Sirmans' previous exercise and this later one are a consequence of the two proxies for real-estate investments having the following means and standard deviations (the FRC index is given first followed by the REIT index): means, 0.36 vs. .049; standard deviations, .013 vs. .092.

***SRI Probability of Failure Study*.** The SRI study used the data from Sirmans' (1984B) paper to estimate the probability of failure after one year as a consequence of an SLA's investing in ARMs or REIT shares.[18] They annualized the quaterly data by multiplying the returns by four and the standard deviations by two.[19] Each observation is considered to be independently and normally distributed. They deducted a "cost of funds" (that averages 8.9 percent) from the mean returns to obtain a net return.[20] The net returns and the annualized standard deviations calculated by Sirmans were used to estimate the "probability of failure," which is defined as the probability that an investment in a portfolio of ARMs and REIT shares would return less than either one or three percent (the assumed net worth that would be consumed by the loss) of the amount invested in one year. The variances and returns from other (including prior) assets and operations were not considered. SRI conclude that there is zero probability of failure when direct investments (as defined by REIT shares) are 11-12 percent of total assets and net worth is one percent of assets, or when "direct investments" are almost 18 percent and equity is three percent of assets. Thereafter, the probabilities rise as shown on Chart 3 (white boxes).

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[18] Alternative investments in FRMs and commercial loans were not considered because they were dominated by ARMs and REIT shares. Other equity investments are considered, but the results are dominated by REIT investments.

[19] With respect to the standard deviations, this is equivalent to assuming a quarterly revaluation of the assets.

[20] The staff of the FHLBB states that the "cost of funds," which is not described in the study, is a quarterly average of monthly accounting numbers reported to the FHLBB by SLAs.

Shortcomings of the Studies. Several important shortcomings of the data used by Sirmans and SRI should be emphasized. One pertains to the series used for ARMs—the U.S. Treasury annualized bill rate plus 250 basis points. Use of this series assumes that ARMs can be repriced quarterly at the current market rate, which is contrary to fact.[21] Unlike Treasury bills and notes, ARMs can give rise to significant capital losses and gains. ARMs also are subject to default risk (as is discussed in Chapter IV). Hence, the standard deviation of ARMs is likely to be considerably greater than the standard deviation of U.S. Treasury bills, the proxy used in the hypothetical studies.

A second shortcoming of the Sirmans and SRI data concerns the return on the real-estate proxy—REIT share yields. The studies probably misstate the returns and variance from direct investment returns because, as Sirmans notes, a large portion of many of the REITs' assets are mortgages and they are structurally very different than direct investments.

A third questionable aspect of the hypothetical studies is indicated by their models having dropped fixed-rate mortgages from the efficient portfolios. SLAs (and other mortgage lenders) continue to make FRMs in fluctuating but significant numbers. In 1985 the average percentage of FRMs closed by SLAs was 46 percent; the lowest percentage closed was 25 in August 1984.[22] One must conclude either that the models used by Sirmans and SRI are misspecified because FRMs are and will continue to be desirable products for mortgagors and investments for SLAs, or that SLAs should be prohibited from making FRMs because these represent an unacceptable risk to the FSLIC.

Fourth, the omission of the returns and standard deviations of SLAs' existing assets and operations limits the studies' usefulness for policy considerations. The data shown in the empirical study presented above indicate that the standard deviation of the average SLA's total net profits does not increase when actual direct investments are made. This finding is at odds with the conclusions of the hypothetical studies, presumably because the actual assets and returns of SLAs differ substantially from those of the proxies used in the studies and/or because the actual standard deviations differ from those measured by the proxies.

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[21] 1984 survey reported in *The American Banker* (p. 2) reveals that some 96 percent of SLAs and savings banks that offer ARMs limit the annual amount by which interest rates, mortgage payments, or both can increase.

[22] FHLBB an August 31, release, "Proportion of Estimated Number of Loans Closed that are Variable Rate by Lender Type and Property Type." Data on dollars of mortgages by type are not given.

Additionally, the SRI model is based on the assumption that an SLA has failed when it books a loss on new investments that is greater than its net worth in any one year. Aside from the model's disregard of an SLA's net profits or losses on its other operations, it overlooks the fact that FSLIC procedures do not allow for measuring failure on the basis of a single year's losses. As is shown below, SRI's one-year measure significantly overstates the probability of failure.

Finally, the SRI model, while eschewing the use of accounting data, uses book figures for the cost of funds.[23] The opportunity cost of funds that would have been consistent with SRI's assumptions is no lower than the U.S. Treasury bill rate. Had SRI used this rate, it would have recorded the return on ARMs as .025 with a standard deviation of zero. The conclusion would have to have been that the "safest" portfolio consistent with their assumptions would include only ARMs.

A Recasting of the SRI Probability-of-Failure Study. The SRI figures were recalculated to determine some of the effects of the more important shortcomings mentioned above. The first row in Table 6 shows the probability of failure as SRI calculated it, but with returns from real estate measured by the returns on the six REITs that held at least 71 percent of their assets in real estate rather than in mortgages.[24] A comparison of the first and second rows shows that SRI's using returns from REITs that did not specialize in real estate ownership increases the calculated probability of failure by twenty-eight percent for "real estate" investments of 40 to 100 percent of total assets. (E.g., 23/18 = 128%.) The probabilities are presented graphically in Chart 3 (black triangles).

The effect on the calculated probabilities of failure when

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[23] They state: "Data developed by the FHLBB on return to thrift service corporations could not be used in the SRI model. They were based on the book value of service corporations [sic] investments, which could not be used for comparison with market data for other assets." (SRI, 1984, footnote, p. 39).

[24] The next highest percentage of real estate is 54 percent; the lowest is two percent. See the appendix in Sirmans (1984B) for a list of the REITs and their percentage investments in mortgages and real estate. The annualized gross mean return on the 71 + percent real estate REIT shares is .232 and the standard deviation is .190. (Sirmans' and SRI's numbers are .195 and .184). Though both the means and standard deviations of the real-estate REITs are higher, the higher returns offset the higher variances.

SLAs make and hold FRMs in proportions that reflect their past and present practices also are calculated for three percentages of FRMs to total mortgages (FRMs plus ARMs)—30, 50 and 70—and six percentages of "real estate" investments to total assets.[25] The returns, standard deviations, and covariances are those measured by Sirmans

TABLE 6

Estimated Probability of "Failure," Assuming Specified Portfolios of Assets and Three Percent Net Worth

	Percentage of Mortages that are FRMs (b)	Probability of "Failure" (a) Percentage of "Real Estate" Investment (c)					
		0	20	40	60	80	100
First Year							
R.E. REITs (d)	0	0	1	7	12	16	18
All REITs (e)	0	0	1	9	16	20	23
	30	17	17	19	21	22	23
	50	37	30	26	25	24	23
	70	47	39	32	28	25	23
Second Year							
All REITs (e)	0	0	0	3	7	10	12
	30	10	9	10	11	12	12
	50	29	21	16	14	13	12
	70	40	30	22	17	14	12
Third Year							
All REITs (e)	0	0	0	1	4	6	8
	30	7	6	7	7	7	8
	50	26	17	12	10	9	8
	70	39	27	18	13	10	8

(a) Failure is defined, per SRI (1984), as the expected losses that exceed net worth at the end of a year.

(b) Fixed-rate mortgages measured by Bank of America's 30-year constant maturity series, per Sirmans (1984B) and SRI (1984).

(c) Real estate investment measured by returns on real estate investment trust (REIT) shares, per Sirmans (1984B) amd SRI (1984).

(d) REIT share returns (and variance) of six REITs that have at least 71% real estate investments.

(e) REIT shares per Sirmans (1984B) and SRI (1984), including eight with real estate investments of 54% and below.

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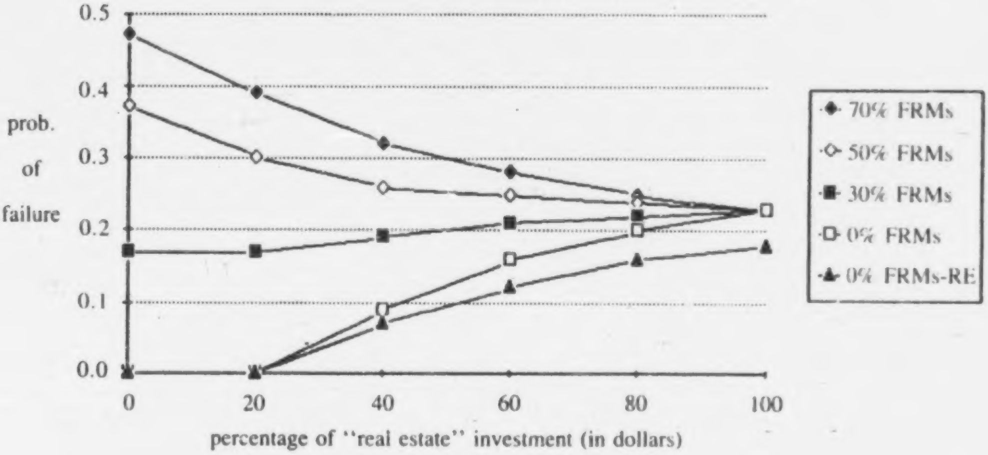
[25] The means, variances and covariances of the returns used for the calculations are those used by Sirmans (1984B) and SRI (1984).

CHART 3

Probability of Failure After One Year
with Three Percent Net Worth



(1984B) and used by SRI (1984). Chart 3 and the "first year" section of Table 6 present the probabilities. With 30 percent of mortgage dollars invested in FRMs (about the lowest percentage that SLAs have held), and zero real estate, the probability of failure after one year is 17 percent. This is one percent more than the probability of failure with 80 percent real estate and no FRMs (20 percent ARMs), and one percent less than a 100 percent real estate portfolio. With any greater percentages of mortgages invested in FRMs, even the Sirmans-measured real estate investments present less risk of failure than mortgage portfolios. With real estate measured by REITs that specialize in these assets, investments in real estate clearly dominate mortgage portfolios that are not almost entirely ARMs.

The SRI risk estimates also were recalculated assuming that an SLA is not considered to be bankrupt until it has booked losses over two or three years that cumulate to more than three percent of its assets (its net worth requirement). This measure of risk is the probability that an SLA with negative net worth at the end of one year also has negative net worth at the end of two or three years.[26] In effect, the FSLIC is assumed to permit an SLA with negative net worth to correct this situation within one or two additional years. The results are

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[26] The calculations use the same normal probability assumption and procedure as the SRI model. The cumulative probabilities require an estimate of the mean area under the normal curve to the left of the point where net loss equals net worth, the expected value under a truncated normal distribution. An estimate of the mean value was calculated as the point with 40 percent of the area under the truncated normal curve to its left. The accuracy of this estimated value is shown by the fact that the correct point is 40.14 percent when the probability of failure is 16 percent, and 39.40 percent when the probability of failure is four percent. Thus, use of an accurate value would reduce the numbers in Table 6 somewhat.

TABLE 4

Distribution of Negative Returns per Year on Direct Investments, Average of Three Years Ended June 30, 1984 by Percentage of Direct Investments to Total Assets and Amount ($1,000) of Direct Investments

		0<1%					1<5%				5<10%
Return On DI	Total By Return	Total 0<1%	$1< $100	$100< $500	$500< $1000	$1000 Plus	Total 1<5%	$100< $500	$500< $1000	$1000 Plus	$1000 Plus
−35>−43	1	1	1								
−30>−35	2	2	2								
−25>−30	2	2	1		1						
−20>−25											
−15>−20	6	5	2	1	1	1	1			1	
−10>−15	10	8	3	3		2	2		1	1	
− 5>−10	47	34	8	10	8	8	13		2	11	
0>−5	207	143	24	48	22	49	57	5	8	44	7
Totals	275	195	41	62	32	60	73	5	11	57	7
Detail of 0>−5%											
−4>−5	11	8	1	4		3	3	1	1	1	
−3>−4	22	13	2	2	1	8	9	1	2	6	
−2>−3	47	39	8	11	5	15	7		1	6	1
−1>−2	49	31	6	14	4	7	15		2	13	3
0>−1	78	52	7	17	12	16	23	3	2	18	3
Totals	207	143	24	48	22	49	57	5	8	44	7
Percentage of 275 Negative Returns											
Totals	100.0	70.9	14.9	22.5	11.6	21.8	26.5	1.8	4.0	20.7	2.5
−10>−43	7.6	6.5	3.3	1.5	0.7	1.1	1.1		0.4	0.7	
− 5>−10	17.1	12.4	2.9	3.6	2.9	2.9	4.7		0.7	4.0	
0>−5	75.3	52.0	8.7	17.5	8.0	17.8	20.7	1.8	2.9	16.0	2.5
0>−3	55.6	36.7	7.6	15.3	7.6	13.8	16.4	1.1	1.8	13.5	2.5

TABLE 5

Returns on Direct Investments, Other Assets, and Total Assets Averaged Over the Three Years Ended June 30, 1984 SLAs in States With Liberal Direct Investment Laws and with Either No or Some Direct Investments in Each Semiannual Reporting Period By Percentage of Direct Investments to Total Assets

		Medians			Means			Standard Deviations			Percentage Negative		
Direct Inv. Percentage	No. of SLAs	Direct Invest.	Other Assets	Total	Direct Invest.	Other Assets	Total	Direct Invest.	Other Assets	Total	Direct Invest.	Other Assets	Total
California—110 SLAs													
0<1%	36	(a)	−0.11	−0.08	(a)	−0.02	−0.02	(a)	1.17	1.17	(a)	58.3	58.3
1<3%	40	3.03	−0.30	−0.14	3.64	−0.14	−0.06	8.54	0.95	0.95	27.5	60.0	55.0
3<5%	17	1.69	−0.17	−0.06	1.98	0.10	0.16	3.86	1.20	1.10	29.4	64.7	64.7
5<10%	12	4.38	−0.82	−0.46	6.20	−0.63	−0.15	5.41	1.26	1.08	16.7	75.0	75.0
10%+	5	10.05	−0.95	−0.29	7.88	−0.81	0.58	4.58	0.89	1.36	0.0	80.0	60.0
Texas—176 SLAs													
0<1%	83	(a)	−0.25	−0.25	(a)	−0.30	−0.26	(a)	0.96	0.95	(a)	60.2	59.0
1<3%	54	6.72	−0.04	0.15	8.96	0.15	0.33	13.26	1.33	1.41	16.7	53.7	40.7
3<5%	20	11.17	0.11	0.44	12.70	0.32	0.81	9.81	1.57	1.35	5.0	45.0	30.0
5<10%	13	4.01	0.65	0.84	6.73	0.43	0.89	9.27	2.11	1.77	23.1	46.2	15.4
10%+	6	8.26	0.23	1.90	8.95	0.60	1.87	6.93	1.86	1.24	0.0	50.0	16.7

Florida—84 SLAs													
0<1%	59	(a)	−0.35	−0.32	(a)	−0.35	−0.31	(a)	0.64	0.63	(a)	71.2	71.2
1<3%	19	12.22	−0.50	−0.32	13.84	−0.34	−0.11	12.24	1.28	1.39	10.5	78.9	68.4
3<5%	4	2.91	−1.63	−1.26	4.47	−1.18	−0.95	5.58	1.00	0.86	0.0	75.0	75.0
5<10%	2	(b)	(b)	(b)	7.75	−0.12	0.40	(b)	(b)	(b)	0.0	50.0	50.0
10%+	0												
Ohio—179 SLAs													
0<1%	149	(a)	−0.43	−0.43	(a)	−0.39	−0.38	(a)	0.65	0.64	(a)	76.5	75.8
1<3%	24	2.90	−0.86	−0.67	3.62	−0.76	−0.68	8.77	0.74	0.79	25.0	79.2	79.2
3<5%	4	4.40	−0.59	−0.34	5.49	−0.57	−0.34	4.74	0.91	0.97	0.0	50.0	50.0
5<10%	2	(b)	(b)	(b)	9.89	0.30	0.93	(b)	(b)	(b)	0.0	50.0	0.0
10%+	0												
Louisiana—70 SLAs													
0<1%	59	(a)	−0.29	−0.29	(a)	−0.19	−0.17	(a)	0.74	0.73	(a)	67.8	67.8
1<3%	8	5.28	−0.46	−0.42	7.04	−0.64	−0.45	9.06	0.43	0.41	25.0	100.0	87.5
3<5%	1	(b)	(b)	(b)	29.79	0.49	1.53	(b)	(b)	(b)	0.0	0.0	0.0
5<10%	2	(b)	(b)	(b)	1.87	0.26	0.35	(b)	(b)	(b)	50.0	50.0	50.0
10%+	0												

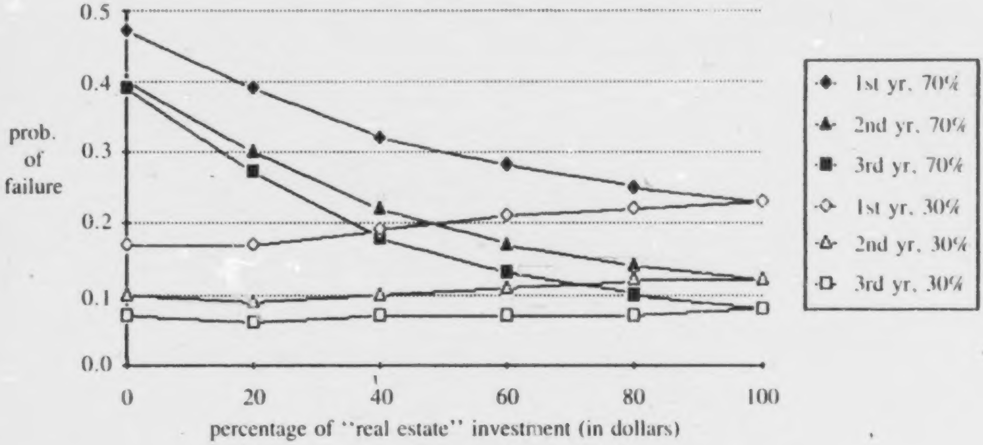
(a) Not meaningful because SLAs with no direct investments are included.

(b) Too few observations.

presented in Table 6 and Chart 4 for various proportions of FRMs, ARMs, and real estate investments (as measured by Sirmans, 1984B). These calculations (shown as "second year" and "third year") show that the risk of failure is not nearly as great as is indicated by SRI (1984). For example, a 100 percent REIT portfolio has a failure probability of 23 percent for a one-year horizon (the SRI assumption), of 12 percent for a two-year horizon, and of 8 percent for a three-year horizon. Even the "best" reasonably realistic mortgage portfolio of 30 percent FRMs and 70 percent ARMs (and no REIT shares) shows a probability of failure of 10 percent at the end of year two and 7 percent at the end of year three, which probabilities are about equal to a 100 percent Sirmans-REIT-share portfolio, and about 22 percent higher than a portfolio of 100 percent real estate REIT shares.

CHART 4

Probability of Failure After One, Two, and Three Years
70% and 30% Fixed-Rate Mortgages and Three Percent Net Worth



I. Changes in Net Worth and the Risk to the FSLIC of Direct Investments and the Current Status of SLAs

An important limitation of the SRI (1984) analysis, even when corrected to reduce some of its shortcomings, is its disregard for the present financial condition of SLAs. The risk to the FSLIC of SLAs' investments and operations cannot be assessed without considering the total situation. This includes the probability that SLAs would become bankrupt as a consequence of insufficient income to cover their interest and operating expenses and of future increases in interest rates and defaults on ARMs that would reduce their net assets, as have occurred in the past. Indeed, the past effects of interest rate increases are generally acknowledged to have put many SLAs in a situation of *de facto*, if not *de jure*, failure, as is documented in Chapter I. It is relevant, therefore, to consider whether direct investments have served to reduce or increase this contingent liability of the FSLIC.

Changes in the New Worth of Weak and Stronger SLAs—An Empirical Study

The Model. The effect of direct investments and other assets and liabilities on changes in the net worth of weak SLAs was studied to determine whether direct investments have improved or reduced the risk faced by the FSLIC. The hypothesis was tested by estimating the following relationship:

$$\Delta NW = f(\Delta A_a, \Delta L_l, NW, S, \Delta EX_e, E), \tag{2}$$

where

ΔNW = change in net worth of an SLA,

ΔA_a = change in asset a of an SLA,

ΔL_l = change in liability l of an SLA,

NW = net worth of an SLA at the beginning of the period,

S = size of an SLA (to account for the effect of scale),

ΔEX_e = change in exogenous factor e relevant to an SLA, and

E = residual error, assumed to be normally and homoscedastically distributed.

(A subscript identifying each SLA and its variables is assumed.)

ΔNW should provide a good measure of the additional risk an SLA poses to the FSLIC, since this indicates the additional amount retained, lost, or withdrawn by the institution. While this and the other variables are subject to accounting biases, these are of much lesser importance for changes than for balances. Changes tend to cancel out the effect of unidirectional biases. Changes also are not as subject as are levels to the concern that such assets as fixed rate mortgages have overstated balances and understated current income.[27]

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[27] Statistical profitability studies, such as Crockett and King (1982), that regress net income on ratios of balance sheet assets and liabilities to total assets in order to determine the yield and cost of each, suffer from this bias.

To provide insights into the assets and liabilities of particular concern to the FHLBB, the following asset and liability variables are specified:

ΔDI = change in direct investments,
ΔADC = change in ADC (acquisition, development, and construction) loans,
ΔUC = change in unsecured commercial loans,
ΔNM = change in nonmortgage loans,
ΔNRM = change in nonresidential mortgages,
ΔRM = change in residential mortgage loans,
ΔJCD = change in jumbo CDs,
ΔBD = change in brokered deposits,
ΔBA = change in FHL bank advances, and
ΔOB = change in other borrowed funds.

Size is measured as

TL = total liabilities, averaged over the period.

Exogenous factors (EX) are measured by

ΔHDI^*TL = percentage change in household disposable income in the county in which an SLA headquartered, from 1980 to 1984, times total liabilities on the assumption that growth in the local market area affects SLAs in direct proportion to their size, *cet. par.*.

The changes are measured from June 30, 1981 through June 30, 1984, and NW is as of June 30, 1981.

To reduce heteroscedasticity and the effect of SLA size on collinearity, all variables were divided by average total liabilities (TL). Equation (2) is estimated as a linear function of the variables listed above (since there is no reason to believe them to be interactive) plus a constant term, all divided by TL.

Weak SLAs are defined as those with RAP net worth (excluding net worth certificates) on June 30, 1981 of three percent of total liabilities or less. This subset of the data includes 170 SLAs, 7.2

percent of the 2349 analyzed.[28] The balance of 2179 SLAs are also analyzed to provide a contrast and additional insights.

Findings. The left side of Table 7 (Δ New Worth) gives the coefficients calculated for the weak SLAs (NW/TL ≤3%) and the stronger SLAs (NW/TL>3%). Since the data are in thousands of dollars, the coefficients measure the experienced dollar-for-dollar relationship between a change in an asset or liability and a change in net worth.

The data show statistically significant (.01 level) coefficients for ΔDI, indicating that a $100,000 increase in direct investments at the average weak SLAs yielded an increase in net worth of $14,000 or was associated with this amount. At the stronger SLAs, the increase in or related net worth averaged $8,000. ΔADC loans and ΔRM have the only other statistically significant coefficients for both subsamples. For the weak SLAs, the data indicate that a $100,000 increase in ADC or RM is associated with an average increase in net worth of $3,000 and $4,000. At the stronger SLAs, the average increase is $2,000 and $3,000. Thus, direct investments, more so than other assets, considerably increased net worth, or were made by associations that increased net worth for other reasons. In either case, the risk to the FSLIC is lower.

It is also worth noting that the only other statistically significant coefficient for the weaker SLAs is Δ residential mortgages (+.04) and that the negative relationship of Δ jumbo CDs and Δ brokered deposits to Δ net worth is very small and statistically insignificant.

J. Direct Investments and "Risky" Assets and Liabilities

Shortcomings of the FHLBB Approach. The FHLBB asserts that direct investments are risky because institutions that hold them also hold ADC loans, unsecured commercial loans, nonresidential mortgages, and nonmortgage loans, and are liable for jumbo CDs and brokered deposits (McKenzie, 1984 and FHLBB 1985A, p. 8). Aside from the FHLBB's unvalidated assertions that the "risky" assets and liabilities mentioned actually represent risks to the FSLIC and that direct investments are in some "improper" way behaviorally related to them, the assumed relationship is faultily based on univariate significance-of-means tests of balances outstanding on June 30, 1984. Such data elide past and present managerial practices and ignore the effect of multiple factors.

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[28] Three SLAs were removed from the sample, the two mentioned in footnote 12 and one that reported growth in total liabilities of 4869 percent in a year. Twenty-five additional SLAs that had net worth to total liability ratios of .30 or more were removed because they appeared to have recently begun operations. The regression coefficients reported in Table 7 are hardly changed when these observations are included, with the exception of NW 6/30/81.

TABLE 7

Variables Associated with Changes in Net Worth and Direct Investments Over the Three Years Ended June 30, 1984
Savings and Loan Associations with Net Worth to Total Liabilities Below and Above Three Percent

Dependent Variables	Δ Net Worth		Δ Direct Investments	
Independent Variables	Coefficients (t statistics)		Coefficients (t statistics)	
	NW/TL≤3%	NW/TL>3%	NW/TL≤3%	NW/TL>3%
Δ Direct Investments (ΔDI)	.14**	.08**	—	—
	(2.14)	(10.52)		
Direct Investments (DI)	—	—	.09	.35**
			(0.99)	(4.68)
Δ ADC Loans (ΔADC)	.03**	.02**	.05**	.01
	(2.14)	(5.09)	(2.75)	(1.19)
Δ Unsecured Commercial (ΔUC)	.51	.33**	.04	–.44**
	(1.42)	(4.88)	(0.10)	(2.48)
Δ Nonmortgage Loans (ΔNML)	–.00	–.02	–.00	–.01
	(0.05)	(1.91)	(0.07)	(0.24)
Δ Nonresidential Mortgage (ΔNRM)	–.01	.03**	–.04	.06**
	(0.33)	(4.88)	(1.71)	(3.38)
Δ Residential Mortgage (ΔRM)	.04**	.03**	.00	.03**
	(4.35)	(10.61)	(0.07)	(3.74)
Δ Jumbo CDs (ΔJCD)	–.02	–.01**	.06**	–.01
	(1.02)	(3.20)	(3.32)	(1.69)

The Model. A multivariate test is made with the following model:

(3) $\Delta DI = f(DI, \Delta ADC, \Delta UC, \Delta NRM, \Delta NM, \Delta JCD, \Delta BD, \Delta BA, \Delta OB, \Delta HDI{*}TL, NW, TL)$, where

DI = direct investments at the beginning of the period, the other variables are as defined above, and the SLA subscript is assumed.

DI is included to measure an SLA's propensity towards (or comparative advantage in) making further investments. NW at the beginning of the period provides a test of the FHLBB's hypothesis that SLAs that make direct investments tend to be weak.

As is described above, a linear relationship is assumed and the variables plus a constant term are divided by TL to reduce heteroscedasticity and collinearity. The data for the weaker (NW as of June 30, 1981 $\leq$3%) and stronger SLAs are analyzed separately.

Findings. The coefficients are presented in the right side of Table 7 (under Δ Direct Investments). For the weaker SLAs, statistically significant (.01 level) positive coefficients are found only for ΔADC, ΔJCD, and ΔOB. The magnitudes of the coefficients indicate that a $100,000 increase in each of these variables is associated with increases in DI of $5,000 (ADC loans), $6,000 (jumbo CDs), and $7,000 (other borrowed funds), on average. For the stronger SLAs, statistically significant (.01 level) coefficients are found for DI, ΔUC, ΔNRM, ΔRM, ΔBD, and ΔBA. On average, $100,000 increases in these variables are associated with the following increases in direct investments: $35,000 (previous direct investments), $6,000 (nonresidential mortgages), $3,000 (residential mortgages), $12,000 (brokered deposits) and $11,000 (federal home loan bank advances). A decrease of $100,000 in unsecured commercial loans is associated with a $44,000 increase in direct investments. Thus, these data do not support the FHLBB's assertion that direct investments are meaningfully associated with "risky" assets and liabilities, unless one assumes that both brokered deposits and FHL bank advances are risky. Even then, the possible risk from obtaining funds from these sources must be balanced against the finding reported in the left side of Table 7 indicating that net worth is not affected, while the use to which these funds were put (direct investments) may have served to increase net worth and, hence, decrease risk to the FSLIC.

K. Failures and Direct Investments

The ultimate criterion of the riskiness of direct investments is whether they are a cause of failures and payouts by the FSLIC, a question that was examined in Chapter I. As noted there, SLAs that are closed by the FHLBB tend to include those that had to write down direct investments and loans, while many SLAs that became economically insolvent because increases in interest rates decreased the market value (but not the book value) of their loans and debentures are allowed to remain open. Also excluded from the official failures are SLAs for which the FSLIC arranged "voluntary" mergers and the "phoenix" associations that the FHLBB created. Thus, the failure data studied comprise those SLAs that the FHLBB was unable or unwilling to keep operating.

Despite the bias in the data towards SLAs that failed because of credit and asset-valuation problems, the multivariate analysis that compared the financial data of officially failed SLAs with similar data from nonfailed peer associations (reported in Chapter I) found no relationship between direct investments and failure. Furthermore, the amount of FSLIC payouts was found not to be related to direct investments.

Several additional investigations were undertaken to determine whether the statistical analyses could be obscuring an economically meaningful relationship between direct investments and failure. First, all SLAs with direct investments to total assets above five percent over the year before failure were identified. There are only 18 such SLAs, 9 percent of the total of 202 official failures. Fourteen of these 18 SLAs (78 percent) had net income before taxes from direct investments over the two years before they failed. This net income reduced the losses from other operations of 13 of these SLAs by a weighted average of 31 percent and a simple average of 36 percent.[29] The fourteenth reported net income on direct investments and other operations; however, the positive amounts for the other operations are of doubtful validity.[30] Three (17 percent) of the remaining four SLAs reported net losses on direct investments that were 3, 9, and 13 percent of net income from other operations.[31] The fourth SLA with a direct investment loss (Republic of Texas) also had a loss from other operations; direct investments increased this loss by 14 percent.

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[29] The figures for Beverly Hills Savings and Loan (California) were corrected after its failure as a result of a special audit. Using the corrected numbers, the averages for the thirteen SLAs are 24 and 31 percent.

[30] This SLA's (Presidio of California) failure is said by the FHLBB to be due primarily to "poorly underwritten construction loans and speculative investments in real estate joint ventures and futures and options contracts."

[31] The 1984 figures of one of these (San Marino of California) change its net income from other operations to a loss, and the loss on direct investments from 13% of other net income to 6% of other net loss.

Eight (4 percent) of the failed S&Ls had direct investments to total assets exceeding ten percent. Only one of these (San Marino) had net losses from direct investments. These losses are 13 percent of its reported or 6 percent of its corrected net income from other operations.

To be make sure that a negative effect of direct investments was not missed, an additional test was conducted by examining all other failures with net income or loss from direct investments to net income or loss from other operations (both before taxes) exceeding ten percent. Seventeen SLAs (8 percent of the total) met this criterion. Of these, 12 (71 percent) had net income from direct investments. Eleven of the 12 had losses from other operations which were reduced by direct-investments income by a simple average of 31 percent and a weighted average of 20 percent, and the other reported net income from other operations that was increased by 20 percent. For the remaining five SLAs, losses on direct investments increased losses from other operations by a simple average of 30 percent and a weighted average of 26 percent (including Eureka of California with 63 percent, for which losses from direct investments is 39 percent of its total losses). With the possible exception of Eureka, the negative impact of direct-investment losses clearly was insufficient to have caused the failure of any of the five SLAs.

Thus direct investments do not appear to have caused any of the failures (with the possible exception of Eureka), but reduced losses from other operations in from two-thirds to three-quarters of the failures where the SLAs had more than trivial amounts of these assets. It should be noted, however, that Eureka's direct investments were only 0.7 percent of its total assets, which would put it within the allowable limit even for federally chartered SLAs.

L. Other Considerations of Risk

The empirical measurements presented above do not speak directly to the principal cause of SLA failures—interest-rate risk. As the analysis presented in Chapter I shows (and as many commentators have observed), the duration-unbalanced portfolios held by SLAs put them at the risk of unexpectedly higher interest rates. The variance of returns or even negative returns measures of risk do not capture interest-rate risk, particularly when the observations are of cross-sectional data.

Direct investments generally are short-duration current-market-return assets. As such, they tend to balance the short-duration liabilities with which most SLAs are funded.[32] In contrast, long-term fixed-rate obligations such as mortgages and bonds subject an institution to interest-rate risk. Of course, other means could be used to offset duration gaps, such as adjustable-rate mortgages and trading in interest-rate futures and options. But unless these are handled with considerable caution and skill, they also subject an institution to credit and fraud risks. Thus, while direct investments are not the only means by which SLAs can reduce interest-rate risk, such investments are useful for this purpose, as well as being a valuable source of earned net worth.

The positive relationship between risk and return that the FHLBB asserts is necessary also should be explored. In general, risk -and return would be positively related on the assumption that investors are risk averse and have to be compensated for accepting more risk. However, higher returns can be obtained without additional risk when the investor has a comparative advantage or can obtain rents from a special resource or expertise that would otherwise not be fully utilized. Direct investments offer such opportunities. The ownership and management of real estate-related assets allows many managers of SLAs to use more fully their knowledge and experience. Furthermore, direct investments offer SLAs savings in monitoring and transactions costs as compared to lending to other investors. This is not to say that *all* SLAs would obtain higher-than-normal profits from direct investments; but those that get higher returns need not have done so at the expense of higher risk. Direct investments are not strongly associated with changes in other assets and liabilities that the FHLBB asserts are risky.

M. Conclusions with Respect to the FHLBB's Limitation on Direct Investments

Empirical Findings on Return and Risk

The data reviewed and analyzed provide no support for the FHLBB's rule restricting direct investments to the greater of ten percent of total assets or twice regulatory net worth. The returns from these assets were found to be significantly greater than those that SLAs appear able to earn from other assets, on the average. These higher returns reduce the risk that an SLA might fail, causing resources to flow from the FSLIC.

The data also show that direct investments are not more risky than other SLA investments. First the standard deviation of total SLA returns is somewhat lower with direct investments than without them. Second, a large portion of the wider measured range of direct-investment returns is due to small (less than $500,000) and relatively small (less than one percent of total assets) investments. Third, negative returns (which is a more meaningful measure of risk to the FSLIC) are lower for higher proportions of direct investments. Those SLAs with direct investments over $500,000 and at least five percent of their assets in direct investments report very few negative returns. The study on which the FHLBB relies (Edwards, 1984) not only does not include an important portion of direct investments (investment in real estate), but does not consider the extent to which the variance of returns is due to economically insignificant investments.

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[32] The FHLBB (1985B, p. 6917) rejects this consideration on the undocumented ground that "many direct investments (e.g., construction and operation of a major commercial building) are far longer-term than fixed-rate mortgages and would exacerbate the existing mismatch." The FHLBB also argues that an institution would not be protected from interest-rate risk by investing in equities if "stock prices fell at a time when inflation, interest rates, and the association's cost of funds increased substantially." (p. 6917)

The FHLBB also incorrectly relies on hypothetical studies by Sirmans (1984B) and SRI (1984) that purport to show that direct investments pose a higher probability of failure than do investments in adjustable-rate mortgages (ARMs). The proxy for real estate returns (returns on REIT shares) is misdesigned and overstates the calculated probability of failure by 28 percent. The studies also assume incorrectly that SLAs will make no fixed-rate mortgages (FRMs). However, if FRMs comprise more than 30 percent of an SLA's mortgage portfolio, the model shows a higher probability of failure than for a portfolio of all REIT shares. Furthermore, SRI overstated the probability of failure by 50 to 65 percent by assuming that an SLA would be closed if it booked losses in excess of three percent of its assets in any one year.

More importantly, the Sirmans and SRI studies ignore the effect of SLAs' present portfolios and net worth. To estimate this relationship, the change in SLAs' net worth was regressed on changes in their assets, liabilities, and other variables over the three years ended June 30, 1984. The coefficients show direct investments that were a significant contributor to net worth increases or that SLAs that increased their net worth tended to have made direct investments. This result was found for both weak and stronger SLAs (those with net worth to total liabilities on June 30, 1981 below and above three percent), and is particularly important because increases in SLAs' net worth serve to reduce the FSLIC's risk. The analysis also found that changes in direct investments were not strongly associated with changes in the assets and liabilities the FHLBB asserts are risky.

Finally, the empirical analysis finds no evidence that direct investments were causally related to SLA failures or that the FHLBB's rule constraining direct investments would have reduced failures or losses to the FSLIC. Rather, there is reason to believe the direct investments have served to reduce the number of failures by increasing SLA net worth and reducing their vulnerability to interest-rate risk.

Risky Loans and Direct Investments

The conclusions presented above include low-borrower-equity ADC loans that were classified as direct investments as required by the FHLBB. However, if, as the Report by the Committee on Government Operations (1985) concludes, the assets of concern are low-borrower-equity loans that were not included with the data used for the analyses, the regulation should cover only these loans. Even then, it should be noted that a restriction on these ADC loans has not been supported by empirical studies.[33]

From a conceptual viewpoint, there is also no reason for the FHLBB to single out direct investments (as the term is used in this chapter) for a special limitation. Indeed, there is reason to believe that a direct investment offers less default and fraud risk than a loan on a similar asset. As is discussed above, because direct investments are owned by an association, it has the right and the opportunity to monitor the cash flow from the asset. In contrast, a SLA that is only a lender does not have the opportunity (and often not the right) to monitor a project, which can make its position quite risky when the borrower has a very low equity investment. This additional risk, however, does not convert a loan into a direct investment; it converts a loan bearing some risk into a loan bearing more risk.

Through rules lumping direct investments together with loans that bear different types and degrees of risk, the FHLBB is making at least two serious mistakes. First, it is incorrectly restraining direct investments, thereby increasing the risk of failures and the cost to the FSLIC. Second, by misclassifying low-borrower-equity ADC loans and joint ventures with true direct investments, it is not identifying (or even obtaining information on) assets that often are highly risky investments. Nor is the regulation likely to be effective in constraining risk-taking by SLA managers who are so inclined. Not only are there many other ways that such managers can take risks (e.g., holding long-term fixed-interest mortgages and bonds), but it is possible for accountants superficially to structure investments as loans rather than as direct investments. Thus, the FHLBB's policy of restricting true direct investments, lumping disparate types of assets together, and permitting distorting RAP accounting for loans, is supported neither by economic nor accounting logic nor by the empirical studies presented above.

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[33] See the Appendix for an analysis of the criticisms of my studies in the Report by the Committee on Government Operations (1985)

Δ Brokered Deposits (ΔBD)	–.02	–.00	–.00	.12**
	(1.26)	(0.23)	(0.20)	(15.22)
Δ FHL Bank Advances (ΔBA)	–.06	–.01	.03	.11**
	(1.75)	(1.92)	(0.76)	(5.71)
Δ Other Borrowed (ΔOB)	.03	.04**	.07**	–.11**
	(1.43)	(4.76)	(2.68)	(4.46)
Δ HDI * Total Liab. (ΔHDI*TL)	–.01	.01*	.00	–.01
	(0.30)	(2.18)	(0.10)	(0.47)
Net Worth 6/30/81 (NW)	–.05	.00	–.13	.02
	(0.33)	(0.06)	(0.66)	(1.01)
Total Liabilities (TL)	.28	–.62**	.64	.10
	(0.40)	(3.57)	(0.74)	(0.21)
Constant	–18.8**	28.0**	–96.4**	–23.4**
	(0.74)	(6.57)	(3.21)	(2.03)
R^2	.25**	.38**	.31**	.34**
Number of Observations	170	2179†	170	2179†
Means of Dependent Variables NW/TL * 100 and Δ DI/TL * 100	1.77	4.97	0.84	0.53

* = .05 level, one tail; for Δ liabilities and assets, significantly different from 1.0; for other variables, significantly different from 0.0.
** = .01 level, one tail; for Δ liabilities and assets, significantly different from 1.0; for other variables, significantly different from 0.0.
† = Excluding 25 SLAs with NW/TL on 6/30/81 > .30.

Appendix Chapter II

Analysis of the Criticisms of the Report of the Committee on Government Operations

After conducting hearings on the direct investment issue and receiving the FHLBB's empirical studies and earlier versions of the empirical studies presented in Chapter II, the Committee on Government Operations issued a Report on *Federal Regulation of Direct Investments by Savings and Loan Associations* (1985). The majority accepted the regulation as a temporary measure; as the Report puts it: "given the weakened condition of the FSLIC fund, it is simply prudent to impose a further temporary regulatory constraint. . . ."[1] (p. 40). The Report rejected the findings of the FHLBB-sponsored studies. In particular, the Report found that "[a] general limitation of all the FHLBB staff papers is that they did not examine how direct investment would impact the risk of insolvency, which is the element of risk that is most relevant from a regulatory point of view." (p. 26)

In its review of my empirical studies (Benston, 1985A, 1985B and 1985C), the Report raises five objections. Taking the less serious of these objections first, the Report complains that the period analyzed is too short, because "an institution may exercise considerable flexibility about when to recognize the losses . . . [by deciding] that a project is still 'under development.' " (p. 27) While this could have occurred, I believe that an association's CPAs who allow an institution to delay recognizing losses unreasonably are courting costly lawsuits. In any event, the bias would appear to be less than that of permissable nonrecognition of interest-rate-change losses and RAP accounting. Furthermore, the three-year period over which income and expenses were measured should reduce the bias.[2]

Second, the Report states that "the data utilized by Prof. Benston in this portion of his analysis do not contain the experience of institutions that actually failed from bad direct investments." (p. 27) This is a correct description of the direct investments analysis in Benston (1984A), which excluded SLAs that failed before June 30,

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[1] A minority of three dissented, stating that "despite the fact that the Report demonstrates that there is no evidence to justify the Bank Board's interim regulation of direct investments, the Report's conclusion does not emphatically state that the rule should be allowed to expire." (p. 41)

[2] In addition, data from the excluded SLAs were analyzed and were not found to be biased with respect to loss situations having been excluded.

1984. However, these data include SLAs that failed after that date, during the post-June 1984 period when FHLBB Chairman Gray predicted SLAs would fail because of their direct investments.[3] Furthermore, all of the official failures between January 1, 1981 and August 31, 1984 were analyzed to determine the extent to which direct investments might have been responsible for the failures. As is documented above, a causal relationship appeared present at only one institution (Eureka of San Carlos, California), at most.[4]

Third, the Report complains that the data used for an earlier version of the failures study is biased because "the FSLIC has tended to postpone action whenever possible on 'bad asset' cases because of the difficulty of finding merger partners when the assets cannot be evaluated reliably, which is typically the situation when an insolvent institution has substantial direct investments." (p. 28) This description of which SLAs are closed is inconsistent with the following evidence. Federally chartered SLAs have been restricted from holding more than three percent of their assets in direct investments. The Veribanc Report, which lists 1,393 tangible-asset insolvent SLAs (as of December 31, 1984) that nevertheless are operating includes 836 federally chartered associations (60%). Of the 71 with negative tangible net worth of over $100 million, 52 (73%) are federally chartered. (Two of these—Talman Home Federal (IL) and First Federal of Rochester (NY)—each have negative net worth of over $1 billion.) Considering that most of the states restrict direct investments, it seems clear that a large proportion of the insolvent but still operating SLAs are those with net worth that became negative for reasons other than direct investments.

Fourth, the Report expresses concern about "the selection of the proper comparison group for evaluating the experience of institutions whose direct investment has exceeded 10 percent of assets." (p. 27) The Report suggests "[t]he proper comparison for policy analysis is . . . with the institutions in the same States who . . . face the same business opportunities [e.g., California, Arizona, Texas, etc.]." (p. 27) The suggestion was taken and the study is reported in the text and in Table 5. The conclusions are consistent with those of the nationwide study.

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[3] In Senate testimony, Mr. Gray said:

> I began to warn, in Congressional testimony and in speeches to industry groups in late 1983 and throughout 1984 and beyond, that excessive risk taking was occurring at too many institutions and that this was leading inexorably to more and very expensive bad asset cases. (Gray, 1985B, p. 3)

It is possible, however, that Mr. Gray may have been referring to bad loans rather than to bad direct investments.

[4] It should be noted that this analysis was not included in the earlier study (Benston, 1984B) that was presented to the Committee.

The fifth and, the Report emphasizes, "most serious inadequacy is that a major component of direct investment—perhaps the most important component—is not reported as such in the data. . . . [C]ertain types of ADC loans favored by aggressive thrift institutions are in fact direct investments covered by the direct investment rule. Such investments are not reflected in the direct investment data analyzed by Prof. Benston, however, because they are reported as loans." (p. 26) The data used in my and the FHLBB's studies, the Report concludes, "cannot . . . support any reliable conclusions about the riskiness of direct investments or the appropriateness of the direct investment rule, because the Bank Board data he analyzed is entirely inadequate for this purpose." (p. 26)

The Report's conclusion would be valid had the FHLBB constrained only low-borrower-equity ADC loans rather than both these loans and direct investments. It is true that the empirical work presented above (and cited by the FHLBB in support of its restrictive rule) speaks only to direct investments as these are listed on the FHLBB's reporting forms. These data show that "true" direct investments tend to be profitable, and hence to decrease, rather than increase, SLAs' net losses and the incidence of failures.

If the FHLBB and the Congress want to restrain ADC loans or other assets, the regulation should refer *only* to the assets of concern. It should be noted, though, that the FHLBB has presented only brief anecdotal verbal reports about unnamed SLAs (with the exception of acknowledged fraud situations) to support its assertion that ADC loans are an important cause of SLA failures and FSLIC payouts. Furthermore, the principal complaint appears to be that SLAs are improperly accounting for fees on ADC loans as current revenue. An answer to this problem would be to remove the fiction of RAP accounting or even to require market-value accounting for all assets, rather than to define a subset of loans as direct investments simply because direct investments are subject to market accounting.

III. Growth, Return, and Risk

A. Regulatory Restriction of Growth

At the same time that the Federal Home Loan Bank Board's (FHLBB) regulation restricting direct investments was enacted, the FHLBB also restricted growth by savings and loan associations (SLAs). The rule (which took effect on March 31, 1985 and will expire on January 1, 1987 unless renewed) imposes the following minimum net worth requirements:[1]

(1) A base factor, that previously could be calculated on a five-year-average basis and that could be phased in over twenty years for newly insured institutions, now will be immediately required on a quarterly basis. For institutions with total assets of $100 million or less that grow at no more than 15 percent, or total assets of over $100 million that grow at no more than 10 percent, the requirement is phased in over five years. Exceptions are made for *de novo* institutions.

(2) A growth factor, equal to the following percentages times a change in liabilities generally between a quarter and the corresponding quarter a year earlier:

(2.1) three percent of a change in liabilities when the change is at an annual rate of 15 percent or less; institutions with assets of $100 million or less are subject to a somewhat lower requirement;

(2.2) three to five percent (graduated) of the change in liabilities when the rate of increase is between 15 and 25 percent;

(2.3) five percent of the change in liabilities when the rate of increase is over 25 percent; and

(3) A contingency factor equal to:

(3.1) two percent of recourse liabilities resulting from the sale of a loan;

(3.2) 20 percent of the institution's scheduled items; and

(3.3) 10 percent of direct investments that exceed 10 percent of total assets.

In addition, institutions with total assets over $100 million cannot increase total liabilities by more than a 25 percent annual rate within any two consecutive quarters without the prior approval of the institution's FHLBB Principal Supervisor Agent (PSA).

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[1] Parts 561 and 583, Subchapter D (Federal Savings and Loan Insurance Corporation), Chapter V of Title 12, Code of Federal Regulations. The requirements are considerably more complicated and extensive than the outline given below.

Thus, proportionately greater net worth is required for faster-growing and larger institutions and those that have been permitted by their PSA to hold more than 10 percent of their assets in direct investments.

B. The FHLBB's Justification for the Restriction

The FHLBB justified the restriction as meeting three concerns. First, the FHLBB fears that SLAs will grow at rates that will overwhelm the Federal Savings and Loans Insurance Corporation (FSLIC) fund. Second, it believes that "rapid growth can so strain the managerial resources of an institution that prudent business practices and controls are not followed." (FHLBB, 1985C, p. 6895). Third, direct investments, alone among assets, are believed to be particularly risky.

Citations to Evidence. In support of the regulation, the FHLBB points to three types of evidence. One is the following forecast of explosive growth: "at the rate of growth experienced between June 1983 and June 1984, the Board can expect 770 institutions, with $353 billion in assets, to double in size within the next four years." (FHLBB, 1984, p. 47857) The second is a staff study (McKenzie, 1984B), which the FHLBB characterizes as showing that "rapid-growth institutions have riskier asset portfolios, less stable source of funds, lower net worth and experience deterioration of net worth [which makes] the increasing risk to the FSLIC . . . apparent." (FHLBB, 1984, p. 47857) Third, the FHLBB claims that

> [s]taff analysis has shown that the greatest percentage of the losses suffered by the FSLIC from problem institutions in 1983 and 1984 have involved rapid-growth institutions with high risk assets. Staff studies of the recent FSLIC caseload show that institutions that have grown more than 25 percent have been responsible for a disproportionate share of expected FSLIC losses. (FHLBB, 1984, p. 47585).

Evaluation of the Evidence. The evidence cited is not sufficient to support the FHLBB's position. First, the explosive growth rates referred to were calculated by extrapolating and compounding the 1983-1984 actual growth rates on the assumption that the experienced rate would continue unabated over four years. No evidence was given to support this assumption.

Second, McKenzie (1984B) simply presented a table comparing the means of selected asset and liability ratios as of June 30, 1984 of SLAs that had 1984/83 growth rates above and below the U.S. mean of 19.7 percent, with t-statistics indicating the statistical significance of the difference between the individual means.[2] No multivariate test was conducted. These data show only that SLAs that grew at slower rates than the mean have statistically significantly (.05 level) greater percentages vs. the means of acquisition, development, and construction (ADC) loans (4.4% vs. 1.0%), construction loans (12.8% vs. 3.2%), nonresidential mortgages (10.0% vs. 6.7%), nonmortgage loans (5.8% vs. 3.8%), real estate investment (for unstated reasons, direct investment in service corporation equity was not included) (0.8% vs. 0.1%), short-term assets (20.1% vs. 13.5%), jumbo CDs (15.3% vs. 5.5%), brokered deposits (8.2% vs. 0.7%), short-term liabilities (68.8% vs. 65.6%), and borrowings (presumably from federal home loan banks) (10.9% vs. 4.9%). The faster-growing SLAs also had statistically significantly lower average passbook savings (6.4% vs. 11.5%), and net worth (4.1% vs. 4.4%). Delinquent loans as a percentage of assets is about the same (1.8% vs. 1.9%). It is not clear why the FHLBB concluded from these data that direct investments were especially risky, that net worth deteriorated (change in net worth was not reported), or that these data show faster-growing SLAs to be a threat to the FSLIC fund. Indeed, the only variable that directly measures losses, delinquent loans, is not higher (on average) at the faster-growing SLAs.

Third, the FHLBB has never presented a staff study showing that faster-growing SLAs are responsible for disproportionate FSLIC losses or supervision problems, to my knowledge. Some brief narratives of unnamed problem SLAs were made public (Schilling, 1984 and 1985), but no systematic study including all SLAs that grew rapidly (including those that did not fail) has been presented.

Consequently, three studies were undertaken. The first, presented in the following section, examines the growth rates of SLAs over successive years to test the hypothesis that a substantial number of SLAs have been growing at rates that might threaten the solvency of the FSLIC fund. The second study examines the sources and uses of SLA growth. The third study examines growth and the risk to the FSLIC by examining the sources of changes in net worth.

C. Evidence on Rates of Growth

The FHLBB's characterization of SLA growth as having been explosive was examined by selecting SLAs whose total-liability (the variable to which the FHLBB's regulation pertains) growth rate for the year 1984/83 exceeded 15 percent and comparing their 1984/83 rates with those of 1983/82 and 1982/81, where each year-end is June

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[2] McKenzie excluded institutions with assets under $10 million as of June 30, 1984. Of the 2953 included SLAs, 751 (25.4%) had asset growth of more than 19.7 percent. No indication is given about the distribution of the data for the purpose of justifying the t-statistic.

30th. The data are from the 2377 SLAs included in the direct-investment return and risk studies presented in Chapter II.[3]

The comparison among annual growth rates is summarized in Tables 1 and 2.[4] For each SLA, the growth rate experienced in 1984/83 is compared to that association's 1983/82 and 1982/81 growth rates. Seven ranges of prior-year growth rates are delineated: a central range of above −15% up to and including +15%; two successive 15-percentage-point ranges above +15%; two below −15%; and two fringe groups of above +45% and below −45%. If the hypothesis of chronically sustained growth were correct, SLAs growing at high rates in 1984/83 should have grown at high rates in 1983/82 and/or in 1982/81, unless there is reason to postulate a change in the financial climate in 1984. Such a change does not appear likely because the important regulatory and technological changes were established by 1981 or 1982; in particular, deposit insurance was increased to $100,000 per account in 1980, deposit interest rate ceilings were largely removed, brokerage of deposits had developed, and growth was not legally constrained.

The data were separated into two groups—SLAs with total assets of less than $100 million ("small" SLAs) and of $100 million and above ("large" SLAs), as of June 30, 1984—because the FHLBB's regulation treats these SLAs differently. As shown in Tables 1 and 2, a total of 333 of the small SLAs (27.4% of the sample) and 441 of the large SLAs (37.9% of the sample) grew at over 15 percent in 1984/83. Of these, 161 of the small (13.3% of the sample) and 221 of the large SLAs (20.8% of the sample) grew at over 25 percent (see panel A); most of these 382 SLAs probably would have had to get prior approval from their Principal Supervisory Agent for this expansion had the FHLBB's regulation been in effect.

Tables 1 and 2 show that relatively few of the SLAs that grew at over 15 percent in 1984/83 expanded at similar or greater rates in the two previous years. Among these faster-growth small SLAs, growth rates of over 15 percent were experienced by a total of only 11.7 percent in 1983/82, and by a total of 8.4 percent in 1982/81 (see panel B). Among the large faster-growth SLAs, a total of 12.2 percent also experienced growth rates above 15 percent in 1983/82, and a total of 4.1 percent in 1982/81. In contrast, the percentages of the total

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[3] The direct investments criterion is due to the FHLBB's imposition of an additional net worth requirement for these assets. The SLAs omitted tend to have been recent direct investors rather than ones that abandoned these assets, and they appear to have recorded positive rather than negative returns. See Chapter I for a more complete description of the data.

[4] Two SLAs are excluded from this part of the study because they recorded an extraordinary growth rate in one year, though not in the other years, as follows (1984/83 is given first, followed by the earlier years): 4869%, 15%, and 60%; 54%, 8%, and 1231%. Including them would have greatly expanded the range of the charts presented in Benston 1985C, and obscured the other data.

TABLE A1

Omitted Observations—Savings and Loan Associations with Incomplete or Negative Direct Investments on the Seven Semiannual Reporting Dates, June 30, 1981 Through June 30, 1984
Analysis of Characteristics

	All		Small (1)		Large (2)	
Number of SLAs	Total	DI>1%	Total	DI>1%	Total	DI>1%
Negative return 10% and above	30	1	15	1	15	0
Negative return between 5% and 10%	10	1	7	1	3	0
Negative return between 1% and 5%	25	8	15	7	10	1
Negative return between 0 and 1%	14	6	10	4	4	2
Total negative returns and balances	79	16	47	13	32	3
Zero return	281	4	220	3	61	1
Positive return between 0% and 1%	35	6	20	4	15	2
Positive return between 1% and 5%	79	19	52	11	27	8
Positive return between 5% and 10%	49	12	26	7	23	5
Positive return 10% and above	80	17	36	12	44	5
Total positive returns	243	54	134	34	109	20
Total	603	74	401	50	202	24
Direct investments>5%						
Negative returns		2		1		1
Zero returns		1		1		0
Positive returns		6		2		4
Total		9		4		5

	All		Small (1)		Large (2)	
Percentages of Totals	Total (603)	DI>1% Total Returns	Total (401)	DI>1% Total Returns	Total (202)	DI>1% Total Returns
Negative return 10% and above	5.0	3.3	2.5	0.2	2.5	0.0
Negative return between 5% and 10%	1.7	10.0	1.2	0.2	0.5	0.0
Negative return between 1% and 5%	4.1	32.0	2.5	1.2	1.7	0.2
Negative return between 0 and 1%	2.3	42.9	1.7	0.7	0.7	0.3
Total negative returns and balances	13.1	20.3	11.7	27.7	15.8	9.4
Zero return	46.6	1.4	54.9	1.4	30.2	1.6
Positive return between 0% and 1%	5.8	17.1	5.0	20.0	7.4	13.3
Positive return between 1% and 5%	13.1	24.1	13.0	21.2	13.4	29.6
Positive return between 5% and 10%	8.1	24.5	6.5	26.9	11.4	21.7
Positive return 10% and above	13.3	21.3	9.0	33.3	21.8	11.4
Total positive returns	40.3	22.2	33.4	25.4	54.0	18.3
Total	100.0	12.3	100.0	12.5	100.0	11.9
Direct investments>5%						
Negative returns	0.3	22.2	0.2	25.0	0.5	20.0
Zero returns	0.2	11.1	0.2	25.0	0.0	0.0
Positive returns	1.0	66.7	0.5	50.0	2.0	80.0
Total	1.5	100.0	1.0	100.0	2.5	100.0

(1) Small = assets less than $100 million on June 30, 1984
(2) Large = assets $100 milion and above on June 30, 1984

TABLE A2

Omitted Observations–Savings and Loan Associations with Incomplete or Negative Direct Investments on the Seven Semiannual Reporting Dates, June 30, 1981 Through June 30, 1984
Analysis of Reasons that Observations with Non-Zero Returns on Direct Investments Were Omitted

	All		Small (1)		Large (2)	
Number of SLAs	Negative Returns	Positive Returns	Negative Returns	Positive Returns	Negative Returns	Positive Returns
No asset balance greater than $10,000	1	16	0	12	1	4
Past periods not reported	43	133	30	73	13	60
Recent periods not reported	8	29	5	21	3	8
Only one or two periods missing	17	32	9	13	8	19
Only one or two periods reported	1	5	1	5	0	0
Data missing sporadically	5	20	1	9	4	11
Negative asset balances in a period	4	8	1	1	3	7
Totals	79	243	47	134	32	109
Percentages of Totals						
No asset balance greater than $10,000	1.3	6.6	0.0	9.0	3.1	3.7
Past periods not reported	54.4	54.7	63.8	54.5	40.6	55.0
Recent periods not reported	10.1	11.9	10.6	15.7	9.4	7.3
Only one or two periods missing	21.5	13.2	19.1	9.7	25.0	17.4
Only one or two periods reported	1.3	2.1	2.1	3.7	0.0	0.0
Data missing sporadically	6.3	8.2	2.1	6.7	12.5	10.1
Negative asset balances in a period	5.1	3.3	2.1	0.7	9.4	6.4
Totals	100.0	100.0	100.0	100.0	100.0	100.0

(1) Small = assets less than $100 million on June 30, 1984
(2) Large = assets $100 million and above on June 30, 1984

TABLE 1

Growth in Total Liabilities, 1984/83
Compared to 1983/82 and 1982/81
Number of Savings and Loan Associations with
Total Assets Less Than $100 Million

		Growth 1984/83				
Prior Year Growth Rate (G)	Year of Comparison	15≤ 25%	25≤ 50%	50≤ 100%	100% +	Totals
A. Number of SLAs						
$G = \leq -45\%$	1983/82	0	2	11	7	20
	1982/81	0	2	15	9	26
$-45 < G \leq -30\%$	1983/82	2	15	11	2	30
	1982/81	1	22	6	1	30
$-30 < G \leq -15\%$	1983/82	31	38	1	1	71
	1982/81	58	53	2	1	114
$-15 < G \leq 15\%$	1983/82	126	41	4	2	173
	1982/81	108	23	4	0	135
$15 < G \leq 30\%$	1983/82	4	5	1	0	10
	1982/81	4	2	1	1	8
$30 < G \leq 45\%$	1983/82	2	0	1	0	3
	1982/81	0	3	3	0	6
$45 < G$	1983/82	7	11	7	1	26
	1982/81	1	7	5	1	14
Number, 1984/83 growth groups		172	112	36	13	333
B. Percentage Distribution						
Prior Year Growth Rates:						
−15% and below:	1983/82	19.2	49.1	63.9	76.9	36.3
	1982/81	34.3	68.8	63.9	84.6	51.1
−15 through +15%:	1983/82	73.3	36.6	11.1	15.4	52.0
	1982/81	62.8	20.5	11.1	0.0	40.5
+15% and above:	1983/82	7.6	14.3	25.0	7.7	11.7
	1982/81	2.9	10.7	25.0	15.4	8.4
1984/83 Growth Over 15% to Total Sample of 1214		14.2	9.2	3.0	1.1	27.4

TABLE 2

Growth in Total Liabilities, 1984/83
Compared to 1983/82 and 1982/81
Number of Savings and Loan Associations
with Total Assets of $100 Million and Above

		Growth 1984/83				
Prior Year Growth Rate (G)	Year of Comparison	15≤ 25%	25≤ 50%	50≤ 100%	100%+	Totals
A. Number of SLAs						
G=≤−45%	1983/82	0	5	13	25	43
	1982/81	2	6	27	36	71
−45<G≤−30%	1983/82	2	24	11	2	39
	1982/81	2	32	7	1	42
−30<G≤−15%	1983/82	35	53	5	0	93
	1982/81	67	81	3	1	152
−15<G≤15%	1983/82	147	55	8	2	212
	1982/81	124	30	2	2	158
15<G≤30%	1983/82	7	10	0	1	18
	1982/81	4	0	0	1	5
30<G≤45%	1983/82	4	3	0	2	9
	1982/81	0	2	1	1	4
45<G	1983/82	5	4	7	11	27
	1982/81	1	3	4	1	9
Number, 1984/83 growth groups		200	154	44	43	441
B. Percentage Distributions						
Prior Year Growth Rates:						
−15% and below:	1983/82	18.5	53.2	65.9	62.8	39.7
	1982/81	35.5	77.3	84.1	88.4	60.1
−15 through +15%:	1983/82	73.5	35.7	18.2	4.7	48.1
	1982/81	62.0	19.5	4.5	4.7	35.8
+15% and above:	1983/82	8.0	11.0	15.9	32.6	12.2
	1982/81	2.5	3.2	11.4	7.0	4.1
1984/83 Growth Over 15% to total sample of 1163		17.2	13.2	3.8	3.7	37.9

number of faster-growth SLAs that had prior negative growth of –15 percent or less are as follows: small SLAs—36.3 percent in 1983/82 and 51.1 percent in 1982/81; large SLAs—39.7 percent in 1983/82 and 60.1 percent in 1982/81.

The inconsistent relationship between current and prior growth is present in each of the growth rates above 15 percent as well, as shown in panel B of Tables 1 and 2. For example, among the 13 small SLAs that grew by 100 percent in 1984/83, only one grew at over 45 percent in the prior year. Among the 43 large SLAs that grew at 100 percent or more in 1984/83, 11 (32.6%) grew at over 45 percent in the prior year.

As a means of examining the observations individually, eight plots were prepared showing the growth rates for each small and large SLA in 1984/83 compared to 1982/83 and 1982/81. (The actual plots are reproduced in Benston, 1985C, pp. 676-683.) These plots confirm the inconsistent relationship between growth in the current year with growth in prior years indicated by Tables 1 and 2.[5]

These data, from a period when SLAs' growth was not constrained by regulation but was subject to the incentives of underpriced deposit insurance and the availability of brokered deposits, are not consistent with the FHLBB's hypothesis that SLAs tend to grow at a constant rate per year. Indeed, faster growth in one year is generally not consistently related to growth in previous years. Furthermore, there does not appear to be too much difference in the growth patterns of small (less than $100 million in assets) and large ($100 million and above) SLAs. While in 1984/83 relatively more large than small SLAs grew at higher rates, this difference is not found over the entire three-year period. However, a very few SLAs do experience high rates of growth for several years, as is shown next. As discussed in Chapter I, a few of these failed, probably as a consequence of this continued high growth.

D. The Sources and Uses of SLA Growth

The FHLBB asserts that growth and risk are positively correlated, presumably causally. It defines "risk"[2] as the obtaining of funds from specified sources (e.g., brokered deposits) and/or the investing in specified assets (e.g., ADC loans or direct investments). Granting this definition of risk (which is supported only by assertion), the method used in the FHLBB staff study (McKenzie, 1984B) is inappropriate because the stock of an institution's assets and liabilities is a function of the markets it faces and has served in the past, as well as previous managerial decisions. Therefore, the rate of growth should be related to flow rather than stock measures of "risk", as follows:

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[5] Regression analysis was not used for two reasons. First, a specific relationship between growth rates and other variables could not be determined from theory. Second, the existence and nature of outliers would have been obscured.

(1) $\Delta L_s/\Delta TL$ or $\Delta A_u/\Delta TL$, where L is a liability derived from source s, A is an asset invested in use u, and TL is total liabilities. The null hypothesis is that growth (ΔTL) is not significantly related to a particular source or use.

Sources of Funds

Table 3A presents data on selected sources of growth ($\Delta L_s/\Delta TL$), expressed in percentages) for all 2377 SLAs for each of the three years ended June 30, 1984, 1983, and 1982, aggregated by the following rates of growth: $<15\%$, $15 \leq 25\%$, $25 \leq 50\%$, $50 \leq 100\%$, and 100%+. Tables 4A and 5A present similar data for 1214 small and 1163 large SLAs. The number and percentages of SLAs in each rate-of-growth category are given first. These figures (which provide the number of observations used for the other statistics in the tables) indicate that relatively more large than small SLAs grew at rates greater than 25 percent in 1984/83 and 1983/82, but not in 1982/81. However, when calculated over the three years (not shown), the average annual growth rates are smaller than the yearly rates and almost the same between asset-size classes. Twelve percent of all SLAs grew at 25 percent or more annually over the three years; they comprised thirteen percent of small SLAs and twelve percent of large SLAs.

The balance of the tables give the medians and means for each year and source of growth. The mean for the ratio in the $<15\%$ growth category is a poor indicator of average growth because, in many instances, the denominator is a very small or negative number. This problem was dealt with by first summing the numerator (change in the sources of funds) and the denominator (change in total liabilities) for the entire sample and then dividing. Neither medians nor standard deviations could be calculated. Standard errors of the means were calculated for the other percentage-change-in-total-liabilities categories.

The statistical significance (one-tail) of differences between the $15 \leq 25\%$ category and the other change categories was calculated and is indicated on the tables. However, these indicators should be viewed with caution, since many of the variables do not appear to be normally distributed, as shown by the differences between the means and medians (shown on the tables) and by measures of skewness

TABLE 3A

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
All 2377 Savings and Loan Associations Aggregated by Percentage Changes in Total Liabilities

SLAs by Growth in Total Liabilities

	Number Year Ended June 30			Percentage Year Ended June 30		
	1984	1983	1982	1984	1983	1982
<0%	183	295	397	8	12	17
0≤15%	1424	1471	1662	60	62	70
15≤25%	365	295	159	15	12	7
25≤50%	267	162	84	11	7	4
50≤100%	81	87	35	3	4	1
100% +	57	67	40	2	3	2
Totals	2377	2377	2377	100	100	100

Sources of Funds (percentages of total liabilities)

	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Jumbo CDs						
<15%[1]				31	6	10
15≤25%	15	1	18	16	10	30
25≤50%	13	10	24	16	20**	36
50≤100%	11	13	35	20	24**	45*
100% +	8	49	55	16	46**	52**

Brokered Deposits						
<15%[1]				4	7	7
15≤25%	0	0	0	2	4	7
25≤50%	0	0	0	7**	9*	14
50≤100%	11	0	0	19**	11**	17**
100% +	22	5	0	30**	24**	10
FHL Bank Advances						
<15%[1]				−12	−38	26
15≤25%	0	0	6	8	0	14
25≤50%	4	0	8	10	7**	15
50≤100%	7	0	1	11	4**	6**
100% +	3	0	0	6	1	2**
Other Borrowed Funds						
<15%[1]				0	−12	18
15≤25%	0	0	0	7	0	10
25≤50%	0	0	3	10**	2	12
50≤100%	3	0	6	10**	5	11
100% +	0	0	0	4**	1	5**
Net Worth						
<15%[1]				6	3	−24
15≤25%	3	2	− 3	3	3	− 2
25≤50%	2	2	− 1	3	2	− 1
50≤100%	2	1	0	3	2	0**
100% +	2	2	1	3	2	2**

TABLE 3B

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
All 2377 Savings and Loan Associations Aggregated by Percentage Changes in Total Liabilities

Uses of Funds (percentages of total liabilities)

	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Direct Investments						
<15%[1]				2	3	4
15≤25%	0	0	0	1	2	4
25≤50%	0	0	0	4**	2	4
50≤100%	0	0	0	5**	2	5
100%+	2	1	0	6**	4	3
Residential Mortgages						
<15%[1]				7	−80	−35
15≤25%	32	16	31	33	17	21
25≤50%	33	23	46	32	24	34
50≤100%	34	30	73	37	30**	46
100%+	17	25	40	25	36**	45
Nonresidential Mortgages						
<15%[1]				12	5	−1
15≤25%	0	0	0	8	6	0
25≤50%	0	1	0	10	9	0
50≤100%	5	1	0	10	8	0
100%+	9	1	0	14*	9	2

ADC Loans						
<15%[1]				21	10	0
15≤25%	9	5	3	18	12	5
25≤50%	13	8	2	21	17	4
50≤100%	15	8	4	26*	17	4
100%+	28	7	2	31**	19*	5
Unsecured Commercial Loans						
<15%[1]				1	0	0
15≤25%	0	0	0	1	0	0
25≤50%	0	0	0	1	0	0
50≤100%	0	0	0	1	0	0
100%+	0	0	0	0*	0	0
Nonmortgage Loans						
<15%[1]				17	6	-1
15≤25%	4	2	5	7	7	9
25≤50%	3	2	5	8	8	8
50≤100%	3	1	4	8	6	7
100%+	2	2	5	5	5	8

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[1] Mean calculated by first summing numerator and denominator over observations and then dividing

* = Statistically significantly different from 15≤25% group at .05 one-tail level

** = Statistically significantly different from 15≤25% group at .01 one-tail level

TABLE 4A

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
1214 Small (Assets Less Than $100 Million) Savings and Loan Associations
Aggregated by Percentage Changes in Total Liabilities

SLAs by Growth in Total Liabilities	Number Year Ended June 30			Percentage Year Ended June 30		
	1984	1983	1982	1984	1983	1982
<0%	92	149	240	8	12	20
0≤15%	789	794	821	65	65	68
15≤25%	174	146	73	14	12	6
25≤50%	110	65	37	9	5	3
50≤100%	36	32	20	3	3	2
100% +	13	28	23	1	2	2
Totals	1214	1214	1214	100	100	100

Sources of Funds (percentages of total liabilities)	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Jumbo CDs						
<15%[1]				17	5	14
15≤25%	13	2	12	13	11	28
25≤50%	10	19	26	11	24*	37
50≤100%	8	20	31	21	30**	40
100% +	11	55	55	24	50**	53**

Brokered Deposits						
<15%[1]				− 3	4	3
15≤25%	0	0	0	1	3	5
25≤50%	0	0	0	6*	9**	13
50≤100%	6	0	0	20**	16*	16
100%+	9	3	0	20**	26**	6
FHL Bank Advances						
<15%[1]				− 3	−17	2
15≤25%	0	0	0	6	1	7
25≤50%	0	0	0	8	7	12
50≤100%	0	0	0	11	2	4
100%+	0	0	0	10	0	2
Other Borrowed Funds						
<15%[1]				0	− 4	7
15≤25%	0	0	0	3	− 1	3
25≤50%	0	0	0	3	0	6
50≤100%	0	0	5	4	0	8*
100%+	0	0	0	3	− 1	4
Net Worth						
<15%[1]				2	2	−23
15≤25%	3	2	− 2	3	2	− 2
25≤50%	2	2	0	2	1	− 1
50≤100%	2	1	0	2	2	0**
100%+	1	2	1	2	2	2**

TABLE 4B

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
1214 Small (Assets Less Than $100 Million) Savings and Loan Associations
Aggregated by Percentage Changes in Total Liabilities

Uses of Funds (percentages of total liabilities)	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Direct Investments						
<15%[1]				1	1	2
15≤25%	0	0	0	0	1	3
25≤50%	0	0	0	1	0	2
50≤100%	0	0	0	2	1	3
100%+	0	0	0	1	1	2
Residential Mortgages						
<15%[1]				−3	−14	−13
15≤25%	36	19	31	38	26	36
25≤50%	38	29	46	40	32	48
50≤100%	49	30	73	51**	33	58*
100%+	24	45	30	33	38	46
Nonresidential Mortgages						
<15%[1]				8	2	−2
15≤25%	0	0	0	5	4	4

25≤50%	4	0	0	12**	3	3
50≤100%	7	1	0	11*	6	3
100% +	15	0	0	17**	8	4
ADC Loans						
<15%[1]				13	6	0
15≤25%	5	2	3	10	9	5
25≤50%	3	7	2	15	14	9
50≤100%	11	14	4	19	19*	7
100% +	12	5	2	17	14	9
Unsecured Commercial Loans						
<15%[1]				0	0	0
15≤25%	0	0	0	1	0	0
25≤50%	0	0	0	0	0	0
50≤100%	0	0	0	2	0	0
100% +	0	0	0	0	0	0
Nonmortgage Loans						
<15%[1]				16	4	− 1
15≤25%	3	3	5	7	9	13
25≤50%	3	4	5	7	13	10
50≤100%	6	3	4	10	7	10
100% +	1	4	5	10	8	11

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[1] Mean calculated by first summing numerator and denominator over observations and then dividing

* = Statistically significantly different from 15≤25% group at .05 one-tail level

** = Statistically significantly different from 15≤25% group at .01 one-tail level

TABLE 5A

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
1163 Large (Assets of $100 Million and Above) Savings and Loan Associations
Aggregated by Percentage Changes in Total Liabilities

	Number Year Ended June 30			Percentage Year Ended June 30		
	1984	1983	1982	1984	1983	1982
SLAs by Growth in Total Liabilities						
<0%	91	146	157	8	13	13
0≤15%	635	677	841	55	58	72
15≤25%	191	149	86	16	13	7
25≤50%	157	97	47	13	8	4
50≤100%	45	55	15	4	5	1
100% +	44	39	17	4	3	1
Totals	1163	1163	1163	100	100	100

	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Sources of Funds (percentages of total liabilities)						
Jumbo CDs						
<15%[1]				49	−16	6
15≤25%	16	1	23	19	9	311
25≤50%	16	5	21	20	16**	36
50≤100%	16	12	54	19	21**	51*
100% +	8	39	50	13	43**	52*

Brokered Deposits						
<15%[1]				12	9	11
15≤25%	0	0	0	3	4	8
25≤50%	0	0	0	8**	9**	15
50≤100%	13	0	0	19**	8	18
100% +	27	7	0	33**	23**	16
FHL Bank Advances						
<15%[1]				−22	−56	50
15≤25%	0	0	16	9	1	20
25≤50%	8	1	16	12	7*	17
50≤100%	11	0	2	11	5*	8**
100% +	4	0	0	5*	1	2**
Other Borrowed Funds						
15%[1]				1	−22	29
15≤25%	0	0	10	10	2	16
25≤50%	8	0	10	15**	3	17
50≤100%	8	0	8	16	8	15
100% +	0	0	1	4**	2	6**
Net Worth						
15%[1]				11	4	−25
15≤25%	2	2	− 3	3	4	− 3
25≤50%	2	3	− 1	4	3	− 1*
50≤100%	2	2	1	4	2*	1**
100% +	2	3	2	3	3	3**

TABLE 5B

Changes in Selected Sources and Uses of Funds as Percentages of Changes in Total Liabilities
1163 Large (Assets of $100 Million and Above) Savings and Loan Associations
Aggregated by Percentage Changes in Total Liabilities

	Medians Year Ended June 30			Means Year Ended June 30		
	1984	1983	1982	1984	1983	1982
Uses of Funds (percentages of total liabilities						
Direct Investments						
<15%[1]				3	5	6
15≤25%	0	0	2	2	3	4
25≤50%	1	1	1	6**	3	5
50≤100%	2	0	3	7**	2	7
100%+	4	1	1	8**	6	4
Residential Mortgages						
<15%[1]				20	−137	−55
15≤25%	29	13	14	29	9	9
25≤50%	29	14	23	26	19	34
50≤100%	19	34	43	25	28**	36
100%+	14	24	59	22	34**	55
Nonresidential Mortgages						
<15%[1]				17	7	−1
15≤25%	1	0	0	11	7	8

25≤50%	0	4	0	6*	12	3
50≤100%	3	1	2	9	10	8
100% +	0	2	3	4**	10	7
ADC Loans						
<15%[1]				30	14	0
15≤25%	17	8	7	25	15	12
25≤50%	20	10	7	26	20	13
50≤100%	26	8	13	31	15	23
100% +	34	13	10	36*	22	20
Unsecured Commercial Loans						
<15%[1]				1	0	0
15≤25%	0	0	0	1	0	0
25≤50%	0	0	0	1	0	0
50≤100%	0	0	0	1	0	0
100% +	0	0	0	2**	0	0
Nonmortgage Loans						
<15%				17	8	−2
15≤25%	4	1	1	8	4	6
25≤50%	3	1	1	8	5	6
50≤100%	2	1	0	6	6	4
100% +	2	2	1	4**	3	3

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[1] Mean calculated by first summing numerator and denominator over observations and then dividing

* = Statistically significantly different from 15≤25% group at .05 one-tail level

** = Statistically significantly different from 15≤25% group at .01 one-tail level

and kurtosis (not presented). For these variables, the medians may provide more useful measures of central tendencies than do the means.

Jumbo CDs. These funds are only partially insured by the FSLIC and cannot be withdrawn until the due date without penalty. Because these lenders are, in effect, showing a willingness to invest, the SLAs that get funds from this source presumably are considered by lenders to be among the less likely to fail. The FHLBB, on the other hand, considers jumbo CDs to be more risky, for the following reasons: "These types of funds are frequently more volatile and are more likely to be involved in 'runs' on institutions. These funds also remove the growth constraint implied by the local retail market and thus enable the rapid acquisition of high-risk assets." (FHLBB, 1984, footnote 1, p. 47857).[6] The multivariate analysis of failures reported in Chapter 1 shows jumbo CDs as not significantly related to failure, a conclusion that is inconsistent with the FHLBB's belief.

Tables 3A, 4A and 5A show that, compared to the slow-growth SLAs (≤ 15%), those SLAs that grew faster tended to get more of their funds from jumbo CDs in 1982/81 and 1983/82, but not in 1984/83. Furthermore, the proportion of such SLAs' growth represented by jumbo CDs has decreased considerably over time, from approximately half in the earlier years to a tenth in 1984/83. Growth and jumbo CDs, then, were not consistently related. It also should be noted, though, that the 1984/83 means for the 50% + growth groups are about double the medians, which indicates that this source of funds was used relatively heavily by a few SLAs.

Brokered Deposits. The validity of measuring excessive risk by the extent to which funds are obtained through brokers has been examined extensively in an analysis by the staff of the Committee on Government Operations (1984B). They found:

> Brokered deposits were not a significant source of deposit growth for the great majority of rapidly growing problem institutions during the period from December 31, 1983, through March 31, 1984. Most problem institutions that sought to expand rapidly found other sources of deposit growth to be readily available. Furthermore, there is no evidence that brokered deposits are more likely to be misused or to contribute to institutions' losses than other kinds of rate-sensitive purchased liabilities. (p. 9)

Nevertheless, the FHLBB asserts that brokered deposits, as such, are a measure of risk.

The data presented in Tables 3A, 4A and 5A indicate that faster-growth compared to slower-growth SLAs tended to get higher proportions of their funds from brokered deposits in 1984/83 and 1983/82 (not in 1982/81). This finding obtains for both small and large institutions. SLAs that grew by 25 ≤ 50% obtained about eight percent of their increase in total liabilities from brokered deposits, while those that grew at greater rates obtained about twenty percent from brokered deposits. Thus brokered deposits appear to have been an important, but hardly a necessary, source of growth in the more recent years. It also should be noted that the means are much above the medians, particularly for the small SLAs, which indicates a considerable diversity among institutions that is not explained by growth alone.

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[6] The reason why deposits made available locally either would or should constrain risky growth is unclear. As long as their deposits are insured, neither local nor foreign depositors have reason to be concerned with risks taken by an institution.

FHL Bank Advances and Other Borrowed Funds. The faster growing small SLAs tended to obtain somewhat less funds from these sources than slower-growth or faster-growth large SLAs. However, the pattern is inconsistent, which precludes drawing responsible conclusions, even though some of the differences are statistically significant.

Net Worth. The data for individual years indicate virtually no differences among SLAs with higher, compared to lower, growth rates, with the exception of 1982/81, when the faster-growth SLAs increased their net worth significantly (.01 level) more than the slower-growth SLAs. Some of the increases in net worth could have come from unearned fees and points recorded as revenue under RAP rules. (Net worth certificates were excluded from the data.)

Uses of Funds

Direct Investments. Tables 3B, 4B and 5B give the statistics for all, small, and large SLAs on the relative amounts of funds obtained from increased total liabilities that were placed in direct investments. These data indicate that only the large faster-growth SLAs tended to put significantly higher proportions of their funds in service corporations and real estate investments, and only in 1984/83. In 1983/82 and 1982/81 there were no economically or statistically significant differences in the growth of direct investments among SLAs that grew at rates of fifteen percent and above. Even for 1984/83, there is no difference in direct investment growth among institutions that grew at rates above twenty-five percent[7]. In that year, the faster-growth large institutions placed a mean of five percent and a median of from zero to two percent of their increase in total liabilities in direct investments.

Residential Mortgages. There is some tendency for faster-growth SLAs to put more of their new funds into residential mortgages, though the higher proportion is statistically significant only for the 25% + growth small SLAs in 1984/83 and the 50% + growth large SLAs for 1983/82. Complicating these measurements is the possibility that institutions made more residential mortgages but sold them to investors in the form of mortgage-backed bonds. In any event, the data indicate that higher growth is not accompanied by lesser investments in residential mortgages.

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[7] The one percentage point higher rate shown for the 100% + large SLA group is due to a single observation that put 53 percent of its increased liabilities into direct investments (mostly service corporations).

Nonresidential Mortgages. The data show somewhat higher proportions of nonresidential mortgages for the faster-growth small SLAs, but lower proportions for the faster-growth large SLAs in 1984/83. The earlier years show no significant differences.

ADC (Acquisition, Development and Construction) Loans. The data indicate that statistically higher proportions of total liabilities tend to be represented by ADC loans for large SLAs that grew at 100% + in 1984/83. These institutions invested about a fourth to a third of their increases in total liabilities in these loans. The average small SLA put relatively less of its funds into these loans. The data indicate increases in the relative amounts of these loans at all sizes of SLAs over the three years. The large SLAs (but not the small) that grew over 25 percent in 1984/83 put significantly more of their funds in ADC loans than did slower-growth SLAs.

Unsecured Commercial Loans. Virtually none of the increased liabilities were placed in these or in consumer loans (not shown).

Nonmortgage Loans. These loans used only ten percent or less of the increase in the liabilities on average among the SLAs that grew at rates above 15 percent (though more than direct investments). No particular relationships with growth are evident, except for a statistically significant (.01 level) lower percentage made by the fastest-growth large SLAs in 1984/83.

Summary and Conclusions

The empirical analysis indicates that both small and large SLAs that increased their total liabilities at rates above 15 percent per year tended to get somewhat more of their funds from brokered deposits in 1984/83 and from jumbo CDs in 1983/82 and 1982/81. Some faster-growth SLAs used high-interest-rate sources of funds much more than others that grew at similar rates. However, about half of the increased liabilities came from ordinary deposits. On the average, faster-growth SLAs tended to increase regulatory net worth (excluding net with certificates) in the same proportion as slower growth institutions, with large SLAs increasing net worth significantly more than small SLAs.

Direct investments are statistically significantly higher at faster-growth large SLAs in 1984/83, though the amount so invested is only a mean of seven percent and median of three percent of the increase in total liabilities. Residential mortgages used about a third of liability increases, on average, with faster-growth and small SLAs putting somewhat more into these assets. Nonresidential mortgages used about a tenth of the increase, though the percentages and significance of the differences among faster-growth and slower-growth SLAs were not consistent. ADC loans used about fifteen percent of the small SLAs' and about a fourth of the large SLAs' increases in liabilities, with the faster-growth SLAs placing significantly more in these loans in 1984/83.

Thus, higher rates of growth tend to have been associated with funds derived from brokered deposits, and used primarily for ADC loans, residential mortgages, and nonresidential mortgages. Net worth of the faster-growth SLAs increased proportionately with their growth, the large SLAs backing their growth with more net worth than the small SLAs. (Some of the increase, though, could be unrealized.) All things considered, the data do not support different regulations of SLAs with assets above and below $100 million. Nor do these data support a higher net worth requirement for direct investments.

E. Growth and the Risk to the FSLIC

The effect of growth on the risk to the FSLIC (and to SLAs) can be estimated by relating growth to changes in net worth (ΔNW).[8] ΔNW should provide a good measure of the risk a savings and loan association poses to the FSLIC, because this indicates the amount of net worth retained by the institution, generally as a consequence of profitable operations. It is also the variable to which the FHLBB is directing its regulation designed to reduce the risk to the FSLIC. It should be noted that net worth (as used in this study) does not include net worth certificates but does include other RAP-permitted items, such as unearned loan fees and points and deferred losses on old mortgages sold. However, the change in net worth is not nearly as biased as the level of net worth, because it reflects only the effects of RAP accounting during the three-year period studied.

The Model

The relationship between net worth and growth was assessed with the following model:

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[8] The hypothesis that growth is significantly generally related to failure was tested and rejected, as reported in Chapter I.

(2) $\Delta NW = f(\Delta TL, NW)$,
where
ΔNW = change in net worth of an SLA over the period,
ΔTL = change in total liabilites (growth) of an SLA over the period,
NW = net worth of an SLA at the beginning of the period, and the subscripts denoting individual SLAs are assumed.

NW was included to account for the expected positive relationship between a high pre-existing level of net worth and further increases in net worth due to earnings on invested capital.

A linear relationship was estimated, with ΔNW regressed on the independent variables plus a constant term. To reduce heteroscedasticity and the effect of collinearity, all variables were divided by TL (average over the period). Thus the coefficients can also be read as measuring the net worth ratio (except that here net worth is a ratio of total liabilities rather than total assets).[9] The period is the three years ended June 30, 1984. Annual data were not used so as to reduce the effects of random variations and because the FSLIC tends not to close an institution unless its net worth is negative or very low for several years.[10]

The observations were divided into six subsamples, as follows:

1. weak SLAs—SLAs with net worth to total liabilities of three percent or less on June 30, 1981, the beginning of the period (170 observations);
2. stronger SLAs—those with net worth to total liabilities of more than three percent on June 30, 1981 (2179 observations);[11]
3. SLAs with growth rates less than fifteen percent (1824 observations);
4. SLAs with growth rates of fifteen to twenty-five percent (285 observations);
5. SLAs with growth rates of twenty-five to fifty percent (145 observations); and

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[9] NW_t/NW_{t-1} and TL_t/TL_{t-1} were not used as variables for two reasons. First, increases in the amount of net worth, rather than the ratio, reduces risk to the FSLIC. Second, regressions of ratios that are not formed by dividing all variables by the same denominator are subject to biases.

[10] Twenty-five SLAs were excluded from the analyses because they have net worth to total liabilities exceeding .30 as of June 30, 1981. These appear to be relatively newly established associations. Including them tends to bias the coefficients of NW, but they have little effect on the other coefficients. Three other SLAs were excluded, two with extraordinary growth rates, as described in footnote 4, and one that had been excluded from the tape used for the regressions.

[11] The mean net worth to total liabilities on June 30, 1983 of the weak and stronger SLAs is given in Table 6. These means are statistically significantly different at the .01 level.

6. SLAs with growth rates of fifty percent and above (95 observations).

The first two subsamples provide a test of two alternative hypotheses: (1) that growth benefits weak SLAs, as opposed to (2) that weak SLAs risk excessive growth to avoid bankruptcy and therefore tend to get weaker. The last four subsamples provide a test of hypotheses about the benefits or costs to the FSLIC of growth at the levels at which the FHLBB's growth regulation requires increasingly greater amounts of net worth. For a test of these hypotheses, the means of the dependent variable, change in net worth, of the subsamples are especially pertinent.

Findings

Table 6 gives the coefficients, t statistics, and other statistics from equation (2). Growth (ΔTL) is significantly (.01 level) related to the change in net worth of both weak and stronger SLAs. The coefficients indicate that a $100,000 increase in total liabilities is associated with a $1,200 increase in net worth at the weak SLAs and a $2,200 increase in net worth of the stronger SLAs, on the average. The initial net worth at the weak SLAs is not significantly related to the change in their net worth over the period, which may simply reflect the generally low level of net worth in this subsample. However, NW at the stronger SLAs is significantly (.01 level) inversely related to growth, indicating that the weaker of that group tended to increase their net worth relatively more. These data are consistent with the hypothesis that growth reduces the risk to the FSLIC and inconsistent with the "growth-as-a-means-to-forestall-bankruptcy" hypothesis.

The coefficients of ΔTL of the four growth-rate subsamples shown in Table 6 indicate that the positive relationship of total liability growth with net worth increases is greatest at the most rapidly growing SLAs. While those that grew below twenty-five percent over the three-year period experienced an insignificant and small (though positive) increase in net worth associated with growth, the coefficients estimate that a $100,000 increase in total liabilities at an association that grew at more than twenty-five percent per year is associated with a $2,200 increase in net worth, on average. The insignificant and virtually zero coefficient of net worth at the beginning of the period (6/30/81) for the subsamples with growth rates above 15 percent indicates that initial weakness is not associated with subsequent changes in net worth at the faster growing SLAs, *cet. par.*. The means of this variable shown in Table 6 provide confirming evidence. The means for SLAs that grew at more than 50 and less than 15 percent per year are about the same, as are the means of those that grew at $15 \leq 25\%$ and $25 \leq 50\%$.

The actual dependent variable, $\Delta(NW/TL)$, provides direct evidence for a test of the alternative hypotheses about the relationship of SLAs' weakness and their growth. The means of this variable given at the bottom of the Table 6 are statistically significantly (.01 level) negative for the slowest growth group ($-.17$), and significantly positive and increasing for SLAs that grew at rates greater than fifteen percent, going from 0.30 to 0.71 to 2.49.[12] Furthermore, the means shown are significantly different from one another at the .01 level.[13] Thus the data are inconsistent with the hypothesis that growth increases the risk to the FSLIC and support the hypothesis that growth is a benefit. However, to the extent that an increase in net worth is due to increases permitted by RAP unearned income, the benefit is not likely to be real.

F. Change in Net Worth Related to "Risk" Variables

An additional study was made of the relationship between the change in net worth and changes in the assets and liabilities designated by the FHLBB as "risky." For this purpose, the following relationship was estimated:

(3) $\Delta NW = g(\Delta L_s, \Delta A_u, \Delta M, NW, TL)$,
where
ΔL_s = change in sources of funds (liability s) at an SLA over the period,
ΔA_u = change in uses of funds (asset u) at an SLA over the period,
ΔM = change in market conditions for an SLA over the period, measured by the change in household disposable income from 1980 to 1984 in the county in which the SLA is headquartered times TL (because the effect of changes in market conditions should be proportionate to the size of the SLA), and
the other variables are as defined for equation (2).

TL is included in the equation to account for differences in scale among the observations. A linear relationship was estimated with a constant term included. As with equation (2), all variables were divided first by TL, and the period over which the data are measured is the three years ended June 30, 1984.

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[12] The size of the SLAs in each group as measured by their total assets (TA) on June 30, 1981 provides some additonal insights. The weaker SLAs are statistically significantly (.05 level, two-tail) larger than the stronger SLAs. The fastest growth SLAs are significantly smaller (.01 level, two-tail) than the slower growth SLAs.

[13] Had the twenty-five SLAs with NW/TL over .30 not been removed, the mean (NW/TL) at the fastest growth SLAs would have been higher.

The assets and liabilities included in equation (3) are changes in direct investments (ΔDI), acquisition, development, and construction loans (ΔADC), unsecured commercial loans (ΔUC), nonmortgage loans (ΔNM), nonresidential mortgages (ΔNRM), residential mortgages (ΔRM), jumbo CDs (ΔJCD), brokered deposits (ΔBD), federal home loan bank advances (ΔBA), and other borrowings (ΔOB). These change-in-amounts variables are subject to much lesser accounting biases than are the amounts (stocks) because they reflect current values to a much greater extent (as discussed in Chapter II). Equation (3) was calculated for each of the four growth rate subsamples used in the previous analysis.

The coefficients estimated, t-statistics, and other statistics are given in Table 7. The coefficients estimated for the slower growth SLAs provide a benchmark against which the assumptions underlying the FHLBB's growth (net worth) regulation can be tested.

In general, the relationships between the change in net worth and the changes in assets and liabilities on which it is regressed are inconsistent with the FHLBB's assumptions. The coefficients of the asset variables that the FHLBB believes are risky—direct investments, ADC loans, unsecured commercial loans, nonresidential mortgages, and nonmortgage loans—are positive for all of the growth samples, indicating that increases in these assets tend to be associated with increases in net worth, which should decrease the risk to the FSLIC (with the exception of RAP-permitted increases in net worth of unearned income on ADC and other loans). Furthermore, the coefficients (particularly for ΔDI and ΔADC) are larger in magnitude and are statistically significant (.01 level) for the slower-growth samples. The coefficients of the change in residential mortgages are positive and significant for all samples, but significantly larger for the slower-growth compared to the fastest-growth (50%+) SLAs. The magnitudes indicate that a $100,000 increase in residential mortgages is associated with a $5,000 increase in net worth at the slowest-growth SLAs and a $2,000 increase at the fastest-growth SLAs, on average.

The coefficients of the change in direct investments (ΔDI) also tend to refute the FHLBB's hypothesis that direct investments present a special risk to the FSLIC. The coefficients are statistically significant (.01 level) and positive for the two slowest-growth groups and positive (though small and not significant) for the faster-growth SLAs. Furthermore, a similar regression using data from weak and stronger SLAs presented in Chapter II (Table 7) shows significant-

TABLE 7

Variables Associated with Changes in Net Worth Over the Three Years Ended June 30, 1984 All Savings and Loan Associations by Growth Rate Coefficients (t-statistics)

Independent Variables	By Rates of Growth			
	<15%	15≤25%	25≤50%	50% +
ΔDI	.20**	.52**	.06*	.03
	(4.90)	(16.85)	(2.32)	(1.93)
ΔADC	.05**	.06**	.02	.01
	(4.92)	(2.84)	(1.87)	(1.86)
ΔUC	.29	.28	.10	.38*
	(1.79)	(1.28)	(0.38)	(2.48)
ΔNM	.03	.03	.03	.03
	(1.88)	(0.75)	(1.50)	(1.96)
ΔNRM	.04**	.04	.04*	.00
	(2.35)	(1.16)	(2.05)	(0.48)
ΔRM	.05**	.04**	.03**	.02**
	(11.81)	(3.28)	(4.01)	(3.31)
ΔJCD	−.02	−.01	.01	−.01
	(1.95)	(0.69)	(0.67)	(1.51)
ΔBD	−.12**	−.12**	−.02	−.01
	(5.23)	(4.03)	(1.38)	(1.51)
ΔBA	−.06**	−.06*	.03	.01
	(4.77)	(2.30)	(1.67)	(0.31)
ΔOB	.04*	.01	.00	.06*
	(2.04)	(0.31)	(0.23)	(2.52)
ΔHDI* TL	.01	−.02	.04	.03
	(1.35)	(1.43)	(1.92)	(0.33)
NW 6/30/81	.03**	.01	−.04	−.00
	(3.14)	(0.41)	(1.61)	(0.06)
TL	−.69**	.25	−.81	−.44
	(4.42)	(0.49)	(1.26)	(0.21)
const.	33.3**	−4.2	−38.6*	−38.8
	(8.76)	(0.25)	(2.00)	(1.58)
R^2	.17**	.55**	.28**	.61**
No. observations	1824	285	145	95

* = Significant at .05 level, one-tail
** = Significant at .01 level, one-tail

ly positive coefficients for ΔDI, which is contrary to the assumptions that underly the FHLBB's rule requiring higher net worth for direct investments.

The coefficients of the change in jumbo CDs and brokered deposits for the SLAs that grew at rates over 25 percent per year are negative but very small and statistically insignificant. Statistically significant negative coefficients were found for brokered deposits, federal home loan bank advances, and (at the .06 level) jumbo CDs for the SLAs that grew at less than 15 percent, which is not consistent with the hypothesis that expensive growth with outside funds is due to fast rates of growth. Negative significant coefficients for brokered deposits and federal home loan bank advances also were found for the SLAs that grew between 15 and 25 percent. This would be consistent with the growth regulation's assumption, were it not for the insignificant coefficient of these variables for the SLAs that grew at higher rates. This latter finding does not support the hypothesis that high rates of growth with outside funds reduces net worth.

The possibility that a change in net worth could be due to SLAs' recording unearned income should be considered. RAP permits such income to be booked for mortgages, though not for direct investments (which also have to be reduced to market values at year-end). Thus, the coefficients of ΔARM, ΔNRM, and ΔRM could overstate the positive relationship between increases in these loans and increases in economic net worth.

G. Conceptual Reasons for Restraining or Not Restraining Growth

Though the studies presented above do not provide support for the FHLBB's regulatory constraint on growth, there are conceptual reasons for such a constraint that should be considered. It seems likely, as the FHLBB states, that an association that grows at rates above 50 to 100 percent for several years would be unlikely to be able to invest efficiently the funds received or to monitor the funds invested. Furthermore, very rapid rates of growth are likely to divert management's attention from ordinary operations and ongoing problems. Although few SLAs fit this pattern, those that do could impose considerable costs on the FSLIC, as the analysis of individual failed SLAs presented in Chapter I indicates.

However, there is also reason to conclude that growth, as such, can reduce the risk to the FSLIC. In addition to the findings of the studies reported above, the following five objections can be made to the regulation adopted by the FHLBB. First, where SLAs are growing to meet the demands of their markets and/or to take advantage of their abilities to use funds effectively, growth can increase earnings and hence reduce the risk to the FSLIC. Indeed, since mutuals cannot raise additional net worth except by increasing earnings (given that the FHLBB will not permit subordinated debentures to be counted as capital), the net-worth-growth regulations would prevent many SLAs from working themselves out of their present difficulties. In this event, the SLAs' managers' response to the alternative of slow bankruptcy might be to make very risky investments with the funds they have available.

Second, restraints on growth, as such, do not eliminate or even reduce excessive risk-taking by insured SLAs. The owners or managers of an institution who are willing to take excessive risks because the expected gains are positive and considerable would remain willing and able to do so with or without the FHLBB's restriction. Indeed, in view of the slow pace at which the supervisors have acted to restrict "unsafe" practices in the past[14], some might have an increased incentive to go for a quick, growth-fueled, risky profit opportunity anticipating a self-justifying gain before they are checked.

Third, while a net worth investment by owners is desirable for providing SLAs with an incentive to avoid excessive risk, there is no reason to believe that a marginally increasing requirement is justified. Not only is this requirement inconsistent with the data presented above, but when more rapid growth is accompanied by greater diversification, relatively less capital could be required to maintain solvency.

Fourth, the data do not support imposing less onerous rules for institutions with less than $100 million in assets and more stringent ones for those with greater holdings has been established. Though the FHLBB may be concerned with the failure of a very large institution, many smaller SLAs should not be less difficult to supervise than a single large institution with the same amount of total liabilities.

Fifth, the necessity for requiring explicit permission *before* an institution can grow at an annual rate of more than twenty-five percent has not been established. It seems likely that the Principal Supervisory Agents (who have incentives to be risk averse) would be slow and loath to approve such applications. Without evidence supporting the desirability of the rule, SLA managers who are effectively serving the growing demands of their customers and whose SLAs meet the FHLBB's net worth requirement should not be constrained additionally.

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[14] See Committee on Government Operations (1984), where the FHLBB is criticized for not using the powers it had to prevent Empire from continuing operations that the FHLBB's examiners had severely criticized.

TABLE 6

Change in Net Worth (ΔNW) and Change in Total Liabilities (ΔTL) Over the Three Years Ended June 30, 1984
Savings and Loan Associations with Net Worth to Total Liabilities Below and Above Three Percent and by Growth Rate

	Coefficients (t-statistics) ΔNW Dependent Variable					
	NW/TL 6/30/81		ΔTL 1984/81			
Independent Variables	NW/TL≤3%	NW/TL>3%	<15%	15≤25%	25≤50%	50% +
ΔTL	.012**	.022**	.007	.016	.022**	.021**
	(4.59)	(28.72)	(1.66)	(1.31)	(6.41)	(11.91)
NW 6/30/81	.024	−.051**	−.040**	−.000	−.020	.006
	(0.39)	(11.87)	(7.99)	(0.01)	(0.84)	(0.18)
Constant	−27.64	32.28**	41.45**	−8.44	−26.93	67.31**
	(1.43)	(7.28)	(10.41)	(0.37)	(1.38)	(2.89)
R^2	.13**	.29**	.07**	.03	.29**	.67**
Number of observations	170	2179**	1824	285	145	95
Means (in percentages) (standard error of mean)						
Δ(NW/TL)	.37**	.02	−.17**	.30**	.71**	2.49**
	(.14)	(.03)	(.02)	(.11)	(.09)	(.32)
NW 6/30/81 (millions $)	2.01**	6.70**	6.51**	5.64**	5.63**	6.76**
	(.08)	(.07)	(.07)	(.15)	(.35)	(.72)
TA 6/30/81 (millions $)	428	231	226	404	279	93
	(88)	(16)	(15)	(73)	(95)	(16)

* = Significant at .05 level, one-tail
** = Significant at .01 level, one-tail

H. Conclusions

The data analyzed yield findings that are contrary to the assumptions and announced concerns of the FHLBB that motivated its imposition of more-than-proportional net worth requirements for growth and for direct investments. Growth tends to be discontinuous. As the data analyzed in section C show, the overwhelming tendency is for faster-growth SLAs to have grown at slower rates in preceding years. The concern of the FHLBB about exponential growth, even over a few years, is not borne out by the past growth experiences of SLAs over the three years ended June 30, 1984, a period when growth was not constrained by net worth requirements and when SLAs had as much incentive for rapid growth as they have now. Nor is the FHLBB's apparent assumption that small SLAs grow at lesser rates than larger SLAs supported.

The univariate analysis of the sources of the SLA growth shows that both small (under $100 million in assets) and large faster-growth SLAs got their funds more from brokered deposits in 1984/83 and from jumbo CDs in 1983/82 and 1982/81. In the earlier years, large faster-growth SLAs also obtained significantly greater proportions of funds from federal home loan bank advances. Analysis of the uses to which the funds were put shows that assets that the FHLBB asserts are risky were inconsistently greater at faster-growth SLAs, but represented relatively small percentages of the increases in their assets. In particular, direct investments were statistically significantly higher at faster-growth large SLAs in 1984/83, but amount only to a mean of seven percent and a median of three percent of the increase in total liabilities.

Growth and risk to the FSLIC also was analyzed by regressing the change in net worth on changes in total liabilities. The findings reveal that growth of total liabilities is associated with increases in the net worth of both weak SLAs and faster-growth ones. On the average, a $100,000 increase in total liabilities is associated with a $2,200 increase in net worth at SLAs that grew at more than 25 percent per year. In addition, the slower-growth SLAs, which the FHLBB presumes do not offer as much risk to the FSLIC as the faster-growth SLAs, show similar increases in FHLBB-defined risk assets and greater increases in direct investments. Furthermore, direct investments are associated with significant increases in net worth. Both relationships indicate that direct investments is not a preferred investment by faster-growth SLA, but is associated with stronger SLAs. Thus the analyses reject the assumptions on which the FHLBB's proposed net worth rule is based.

The finding that only some of the SLAs exhibited high successive rates of growth, were funded by high proportions of brokered deposits, and invested relatively large proportions of their funds in ADC loans indicates that the FHLBB probably should not have rejected the alternative of individual supervision and monitoring in favor of a broad rule applied to all SLAs. The FHLBB argues that growth "in the range of 50 to over 100 percent per year . . . makes it difficult, if not impossible, for the Board's staff to examine and supervise institutions in a timely fashion. . . . [T]he damage is done before any supervisory examination is made and well before any corrective action can be taken by the Board." (FHLBB, 1985C, p. 6903). Yet, by not facing up to its regulatory responsibilities and by not using the computer equipment and models that it should to monitor SLAs at least monthly and to predict failures (as shown in Chapter I), the FHLBB is trading constraints on net-worth-increasing and therefore risk-reducing operations by what the data indicate are a majority of SLAs for mechanistic constraints on a few "bad actors."

These conclusions should not be read as rejecting the entirety of the FHLBB's move toward higher net worth requirements. The FHLBB is correct in assuming that the moral hazard of underpriced deposit insurance is a threat to the safety of the FSLIC fund. This threat can be reduced by requiring SLAs to hold higher levels of net worth. In this regard, the changes adopted by the FHLBB are inadequate. SLAs still can hold very low levels of net worth, as long as they do not grow at rates above 15 percent. Furthermore, regulatory net worth is measured so as to give SLAs incentives to make loans with high up-front points and fees, as long as these do not qualify as direct investments. Some specific suggested changes are given in Chapter V.

IV. Adjustable-Rate Mortgages and Brokered Deposits

A. Introduction

In response to the sharply higher number of economic insolvencies and legal failures of SLAs during the 1980s, the FHLBB took four types of actions:

1. ''regulatory accounting principles'' were adopted so that economically weak and insolvent SLAs would appear to be solvent;
2. associations were allowed and encouraged to write adjustable-rate rather than fixed-rate mortgages;
3. an attempt was made to discourage brokered deposits by restricting deposit insurance coverage on these funds; and
4. direct investments and growth were constrained.

Chapters I, II, and III describe and analyze the accounting changes, constraints on direct investments, and constraints on SLA growth. The other two responses by the FHLBB—those directed at adjustable-rate mortgages and brokered deposits—are considered in this chapter.

B. Adjustable-Rate Mortgages (ARMs)

The Benefits and Costs of ARMs

The fact that the principal cause of the financial distress of savings and loan associations was their holding duration-unbalanced portfolios was recognized by the FHLBB. Its almost singular response to that situation was first to permit SLAs to make adjustable-rate mortgages (in April 1981) and then to emphasize the necessity of their making these mortgages.[1] Indeed, in speeches to industry groups, articles in official and other publications, and testimony before Congress, FHLBB officials promoted ARMs as both a necessary and sufficient solution to the industry's problem.

Adjustable-rate mortgages have supplanted fixed-rate mortgages (FRMs) to a considerable degree. The percentage of ARMs to total mortgages closed by SLAs has varied considerably, however, going from 32 percent in September 1981, to 46 percent in May 1982, down to 26 percent in May 1983, and up to a high of 75 percent in August 1984. In 1985 the level has averaged 54 percent, fluctuating between 60 percent in January and 50 percent in September.[2] As of September 1985, approximately 40 percent of the mortgage portfolios held by SLAs were ARMs and balloon mortgages.

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[1] Interest-rate futures or options also can be used by SLAs to neutralize duration-imbalance risk. However, most associations have found dealing in this obligation complicated and risky. Only approximately 10 percent of SLAs have used futures and/or options (long and short), and these cover only 3 percent of thrift assets. (Data as of March 31, 1984, per FHLBB).

Although ARMs offer SLAs the benefit of interest rates that adjust to the market, they have two important limitations. First, to counter consumers' concerns that substantial increases in interest rates would have a devastating effect on their monthly payments, most savings and loan associations and savings banks that offer ARMs limit (cap) the annual amount by which interest rates, annual mortgage payments, or both can increase.[3] Such caps have been institutionalized by the underwriting guidelines of the Federal Home Loan Mortgage Corporation (Freddie Mac) and the Mortgage Insurance Companies of America (MICA). These guidelines suggest a maximum five percent lifetime rate cap and annual payment increases of no more than two percent for mortgages. In addition, ARMs are expected to have a maximum 90 percent loan-to-value ratio and no negative amortization.[4] Many ARMs dispense with an increase in monthly payments, instead extending the maturity date of the loans. While these constraints make ARMs more acceptable to consumers, collaterally they are less useful as a means of reducing duration imbalances. In addition, they make mortgage bonds backed by ARMs more expensive to market.[5]

Second, ARMs have been offered to consumers at low initial interest rates ("teaser rates"). These obligations suffer from negative amortization. Unless the downpayment percentage is sufficiently high or the market prices of the properties mortgaged increase considerably, the mortgagor has an incentive to default.[6] Thus, SLAs may be trading lower interest rate risk for higher credit risk.[7]

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[2] Source: Federal Home Loan Bank Board Release, "Proportion of Estimated Number of Loans Closed that are Variable Rate by Lender Type and Property Type."

[3] A survey published in the *American Banker* (August 31, 1984, p. 2) revealed that 96 percent of these institutions made ARMs with caps.

[4] See *Inside Mortgage Finance*, November 16, 1984, p. 3 for more details.

[5] See Palash and Stoddard (1985) for a review of the terms on ARMs (including an extensive analysis of the value of the caps to the borrower) and for references to the literature, as well as a model indicating that the principal determinants of the proportion of ARMs to total mortgages closed are the spread between ARM and FRM rate (positively related), the interest rate on FRMs (positive), and the yield on 20 year less one year Treasury bills (negative).

[6] See Moser and Whitely (1984) for examples.

[7] In a study of ARMs made in 1983, Lea (1985) finds that the thrift institutions studied appear to have underpriced the mortgages. He concludes: "Given the pressure to invest in ARMs, institutions may gamble that rates will not rise as much as expected by the market. . . . Alternatively, thrift institutions may recognize that if rates rise more rapidly than caps allow, and the market value of the loans falls below the par value, the federal government, through the Federal Savings and Loan Insurance Corporation (FSLIC), will ultimately bear this interest-rate risk." (p. 480).

Evidence on Credit and Failure Risk

Some evidence is available on the extent to which ARMs have reduced or increased the risk to SLAs and the FSLIC. Table 1 shows the experience of the Mortgage Guarantee Insurance Corporation with ARMs and FRMs.[8] For both 90 and 95 percent loan-to-value ratio (LVR) mortgages made in 1981, 1982, or 1983, the percentages on which claims were paid and which defaulted are higher for ARMs than for FRMs by 0.6 and 1.2 percent respectively; the difference is greater for the higher LVR mortgages. Thus, ARMs appear to impose greater credit risks on lenders.

The percentage of ARMs to total mortgages held on December 31, 1984 by SLAs that failed in 1985, compared to their nonfailed peers, provides a test of the hypothesis that ARMs reduce the probability of failure. (These data are not available for previous years.) ARMs were 27 percent of the mortgages held by both groups. Among the twenty-two failures, the percentage ranged from zero to 89 percent. Hence, the holding of ARMs appears to have had no deterrent effect failure in 1985. It should be noted, though, that this was not a period characterized by large changes in interest rates.

Conclusion

While there is reason to believe that SLAs' holding ARMs rather than FRMs would reduce their exposure to interest-rate risk, it seems doubtful that emphasis on this asset by the FHLBB is an adequate response to the difficulties facing the industry. ARMs are subject to greater credit risk than are FRMs and, at least in 1985, SLAs that failed held as great a percentage of ARMs as similar SLAs that did not fail. Furthermore, the fact that only half the mortgages closed by SLAs are ARMs, despite a several-years' campaign by the FHLBB, indicates that FRMs do not fulfill the preferences of many SLAs and/or their customers. Consequently, it is doubtful if this form of mortgage will be a sufficient means of protecting the FSLIC from the effects of interest-rate risk on insured SLAs.

C. Brokered Deposits

The FHLBB's Attempt at Regulation

In January 1984 the FHLBB and the FDIC jointly announced a proposed regulation that would have virtually denied deposit insurance to depositors who used the service of brokers to place their funds. This action followed a period of rapid growth of brokered deposits, from 1.7 percent of total deposits in December 1982 to 5.0 percent in March 1984. Several factors could explain this growth. One is the removal in October 1983 of regulatory ceilings on most time deposits, which permitted institutions to bid for the funds of depositors who do not value the physical convenience of a nearby banking office. These depositors include many who had invested in money market mutual funds and who were familiar with banking by mail and through brokers. A second factor is an increased concern for safety that followed the failure and liquidation in 1982 of the Penn Square Bank (Oklahoma City, OK) and the FDIC's allowing uninsured depositors to absorb considerable losses. This concern, together with improvements in computer technology that lowered transaction and monitoring costs, made it desirable for brokers to offer depositors with over $100,000 to invest the option of getting 100 percent deposit insurance coverage by placing funds in accounts at several institutions. A third possible factor is demands for funds by opportunistic SLA managers and owners for the purpose of making risky and even fraudulent investments.

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[8] The data were kindly made available by Warren Matthews, Director, Product Analysis and Development, Mortgage Guarantee Insurance Corporation.

Arguments For and Against Restrictions

In hearings before the Commerce, Consumer, and Monetary Affairs Subcommittee of the House of Representatives Committee on Government Operations in March 1984, Chairman Edwin Gray of the FHLBB emphasized the "opportunistic/fraud" explanation for brokered deposits. He presented a number of "horror stories" to show that SLAs' use of brokered deposits for the purposes of taking excessive risks could not be controlled by the FHLBB. He also objected to brokered deposits because, he asserted, brokers improperly benefit from the federal deposit insurance subsidy that was intended to be restricted to savings and loan associations.[9] He was supported by William Isaac, Chairman of the FDIC, and by a spokesman for the American Bankers Association.

Most of the other witnesses testified against the proposed regulation. They argued that brokerage was a useful mechanism for low-cost transfers of funds among users and providers of funds. This mechanism allowed SLAs to obtain funds more cheaply than by building branches and allowed savers to find the highest returns on their funds. Furthermore, the witnesses pointed out that opportunistic bankers could obtain funds through direct advertising and/or by using their own personnel to contact potential investors.[10]

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[9] See Committee on Government Operations (1984B) for a summary of the hearings and the issues.

[10] See Benston (1984A) for a more extensive review and analysis of the issues.

On June 20, 1984 Judge Gerhard Gesell of the Federal District Court (District of Columbia) declared that the agencies had exceeded their statutory authority and issued an injunction to block the implementation of their limitation of insurance on brokered deposits. In January 1985 the United States Court of Appeals for the District of Columbia affirmed Judge Gesell's opinion. Consequently, the proposed rule has not been implemented. The FHLBB now requires SLAs to report monthly the amounts of their brokered deposits, fees, and interest rates paid.

Evidence

In September 1984 the Committee on Governor Operations issued its Report (1984B). Based on a statistical study and review of the evidence presented at the hearings, the Report concludes:

> Brokered deposits were not a significant source of deposit growth for the great majority of rapidly growing problem institutions during the period from December 31, 1983, through March 31, 1984. Most problem institutions that sought to expand rapidly found other sources of deposit growth to be readily available. Furthermore, there is no evidence that brokered deposits are more likely to be misused or to contribute to institutions' losses than other kinds of rate-sensitive purchased liabilities. (p. 9)

The empirical study of SLA failures reported in Chapter I largely supports this conclusion. The univariate analysis found brokered deposits to be significantly higher at the failed SLAs that failed in 1984 and 1985 than at their nonfailed peers. However, jumbo CDs (CDs over $100,000), federal home loan bank advances, and, indeed, large liabilities generally also are significantly higher at the failed SLAs than at their peers, as follows:

	Failures in	
As percentages of earning assets:	1985	1984
Brokered deposits	12.4%	15.4%
Jumbo CDs	19.5	18.8
FHLB advances	7.5	7.8
Large liabilities	26.3	26.1

Thus, it cannot be concluded that brokered deposits should be singled out from among other sources of funds as the cause of the failures, though brokered deposits (among other sources) could have permitted risk-seeking SLAs to have obtained funds for their adventures.

More importantly, a significant relationship between the level of brokered deposits (expressed as the ratio of brokered deposits to earning assets) and failure was not found in the multivariate analysis. While an increase in the ratio of brokered deposits to earning assets is significantly related to failure when the ratios of net worth and large liabilities to assets was excluded from the regression, the magnitude of the relationship is small except at high rates of change. In particular, a 10 percent increase in brokered deposits relative to earning assets is associated with an approximate 12 percent higher probability of failure. A 30 percent increase in brokered deposits, however, is associated with a 66 percent increase in the probability of failure. The analyses of selected individual failures presented in Chapter I confirm the conclusion that brokered deposits are likely to be a problem only at high rates of increase. However, because great increases in brokered deposits and total liabilities (growth) tend to be coincident, it is not possible to say which is causally related to failure.

Conclusion

The present study supports the conclusion of the Committee on Government Operations (1984B) that removal or restriction of deposit insurance on brokered deposits is not justified. The Committee further concluded that

> whatever abusive practices or increased costs to the insurance funds are occurring in institutions using brokered funds derive not from the brokered nature of the additional deposits these banks and thrifts are obtaining but from the highly risky and improper uses to which some institutions are putting these additional funds. Forceful use of their existing supervisory powers on a case-by-case basis should therefore be the agencies' first mode of attack on the problems of improper lending and excessive growth by these institutions. (p. 17)

The data analyzed in the present study are consistent with this recommendation.

V. Conclusions and Policy Recommendations

A. Conclusions

The principal conclusion of Chapter I is that the failures of the 202 SLAs studied were caused primarily by the effect of interest rate increases in the late 1970s and early 1980s on portfolios consisting of long-duration assets funded by short-duration liabilities. Despite the fact that those losses made many SLAs economically insolvent, the accounting rules accepted or formulated by the FHLBB kept them from becoming legally insolvent, at least for a time. In particular, SLAs do not have to record (book) the capital losses on fixed-interest-rate loans and debt securities that declined in market value as a result of market interest rate increases, as long as the assets are not sold (realized). The FHLBB adopted regulatory accounting rules that allow SLAs to defer realized losses on mortgages sold, and to record as income (and hence as net worth) revenue from loan fees that were not fully earned. Net worth certificates were issued by the FHLBB to keep regulatory net worth from becoming negative.

Although the regulatory accounting procedures (RAP) adopted by the FHLBB were effective in allowing them to maintain the fiction that many SLAs had not failed and would not have to be liquidated or merged (causing the FSLIC to record losses), these procedures could not prevent the slow "bleeding to death" of many associations. Interest-rate spreads became negative as interest on deposits was paid at closer-to-market rates (as the federal interest rate ceilings were phased out), while revenue did not increase proportionately because much of it came from below-market-rate mortgages. As the study presented in Chapter I indicates, failures occurred as a result of the negative spreads and consequent negative net worth.

The study does not indicate that deregulation of investment powers was a cause of the official failures. Consumer and commercial loans were negligible at the SLAs that failed. Direct investments—defined as real estate held for development, investment, and resale, and equity investments in service corporation subsidiaries—were found to be neither a cause of failures nor responsible for higher FSLIC payouts at the associations that failed. On the contrary, the data presented in Chapter II indicates that direct investments provided SLAs with much higher earnings than did their other operations, while reducing somewhat the variance of earnings. More meaningful than the variance as a measure of risk to the FSLIC is the extent to which earnings are negative. The study found an inverse relationship between negative total net earnings and the proportion of assets in direct investments. Hence, the regulation adopted by the FHLBB in 1985 that restricts direct investments to a maximum of ten percent of assets (unless the FSLIC-insured association obtains specific permission) appears to be counter-productive.

Growth is the subject of the other restrictive regulation adopted by the FHLBB. The analysis presented in Chapter III does not support the premises on which the regulation is based. Neither is growth as continuous as the FHLBB claimed nor is it associated with failures. On the contrary, the study finds that growth in general tends to be associated with increases in SLAs' net worth.

Adjustable-rate mortgages (ARMs) have been emphasized by the FHLBB as a means by which SLAs could reduce their asset and liability duration imbalance. However, the analysis presented in Chapter IV indicates that this change has not been as accepted by SLAs or their customers as the FHLBB had hoped (only approximately half the mortgages closed are ARMs) and may subject SLAs to higher credit losses.

Finally, brokered deposits would have been severely restricted had the FHLBB been permitted by the courts to limit deposit insurance to $100,000 per broker. The analyses presented in the report of the Committee on Government Operations (1984B) and in Chapter I do not support this constraint.

Thus the studies presented above indicate that the FHLBB generally has adopted or attempted to adopt misguided and harmful rules to deal with a very serious situation.

B. Observations of a Deputy Director, Liquidations, FSLIC

The conclusions of the statistical study of failures and the SLAs' newly acquired investment powers, particularly in direct investments, on which the upcoming recommendations are based, are supported by the following observations of a person with direct experience, a former (resigned in 1986) FSLIC Deputy Director, Liquidations, Scott Taylor:[1]

> For more than two years I have been in charge of liquidating FSLIC-insured institutions. During that time over 50 institutions were placed in receivership, and 26 were so badly scarred that they are being fully liquidated, with over $3.2 billion in historical assets.

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[1] Quoted by permission by Mr. Taylor from correspondence dated November 1985.

> Those companies did not fail because of misuse of broader asset and investment powers, or because of direct investments in real estate. They failed because of fraud, incompetence and criminality which was not deterred or detected early enough, and which has little if anything to do with the ability to make direct equity investments or with broader asset powers.
>
> Despite strong assertions by some, I can see no basis to claim that direct investment authority is a cause of increased failure or a risk to the FSLIC. But if regulators do not examine and supervise adequately to prevent and deter wrongdoing, crime, fraud and incompetence *will* cause increased failures regardless of legal limits on investments. It is difficult to see the wisdom of barring the great majority of sound, well-managed savings institutions from safe and profitable business simply because regulators fail to prevent or deter others from crime.

C. Recommendations

Direct Investments

SLAs should be permitted to use their comparative advantage in real-estate-related projects to make and manage direct investments. The investments referred to are those that are the subject of the study presented in Chapter II—assets that are owned by SLAs, not loans that the FHLBB defines as direct investments (generally low-borrower-equity acquisition, development, and construction—ADC—loans). Direct investments offer SLAs several advantages over other investments. First, they tend to provide SLAs with higher earnings than can be obtained from many other investments and operations, apparently because they allow SLA managers to use their skills and experience in making and monitoring real-estate-related investments. Second, direct investments have shorter durations than many other assets in which SLAs have invested; hence, they reduce the institutions' exposure to interest rate risk. Third, the returns on direct investments tend to be imperfectly correlated with the returns from SLAs' other activities; hence, the variance of returns tends to be reduced. All three factors reduce the risk imposed on the FSLIC. It should be noted that the recommendation is not that SLAs make direct investments—only that they not be constrained from doing so.

Growth

Growth, as such, should not be constrained except for proportional capital requirements. A general limitation, such as that imposed by the FHLBB, is not supported by the analysis of the data, which indicates that the constraint would be counterproductive. This is

TABLE 1

Claims and Default Experience as of September 30, 1985
Adjustable Rate (ARM) Compared to Fixed Rate (FRM) Mortgages

Year of Mortgage	Number of Mortgages		Claim Incidence			Default Incidence		
	ARM	FRM	ARM	FRM	ARM-FRM	ARM	FRM	ARM-FRM
90% LVR								
1981	8517	84406	5.3	4.3	1.0	2.8	1.9	0.9
1982	29553	65192	4.4	2.8	1.6	4.0	1.9	2.1
1983	38693	111716	1.0	0.8	0.2	2.7	1.6	1.1
Total	76763	261314	2.8	2.4	0.4	3.2	1.8	1.4
95% LVR								
1981	4575	47441	17.2	7.1	10.1	4.0	2.7	1.3
1982	16170	39996	8.3	4.9	3.4	5.1	3.0	2.1
1983	27746	99242	1.9	1.7	0.2	4.3	2.7	1.6
Total	48491	186679	5.4	3.8	1.6	4.6	2.2	2.4
Total	125254	447993	3.8	3.2	0.6	3.7	2.5	1.2

LVR = loan-to-value ratio
Claim incidence = number of claims paid/number of mortgages, in percentages
Default incidence = number of defaults/number of mortgages, in percentages

Source: Mortgage Guarantee Insurance Corporation not to say that SLAs that grow should not be adequately capitalized, or that undercapitalized SLAs should not be constrained from adding liabilities that would reduce the relative amount of their capital.

Capital Requirements and Deposit Insurance Pricing

SLA managers and owners would have incentives not to take excessive risks if they bore more fully the cost of their acts, and requiring a greater investment by owners is generally recognized as an effective means of providing this incentive. The investment could be in the form of equity capital or subordinated debentures. The debentures should be completely surbordinated to the claims of the FSLIC, and the holders should not be able to withdraw their funds from the institution, directly or indirectly, before the debentures' maturity. It would be preferable if a portion of the debentures were short-term so that the institution would have to obtain funds periodically from the market. The rates that the institution would have to pay would give the supervisory authorities an early warning about the risks the institution was taking.

As long as deposit insurance is underpriced with respect to the risk imposed on the FSLIC, SLA managers and owners have incentives to take more risks than they would take were the insurance correctly priced. Unfortunately, determining a risk-adjusted insurance rate is difficult, in large part because of the difficulty of measuring the effect of specific assets, liabilities, and activities on the probability that the FSLIC will have to expend funds. Such holdings and activities include fraud and self-dealing, the holding of duration-unbalanced portfolios, growth without a well-managed and monitored investment program, and insufficient economic net worth to absorb losses. The variance of returns on and the costs of *individual* assets and liabilities is not a sufficient measure of risk; rather, the totality of the variance and the extent to which negative total returns may be incurred should be considered. In any event, the FHLBB should not simply assert that a particular activity is "risky"—it first should conduct adequate research.

Some specific measures could be adopted by the FHLBB. For example, charging SLAs for the cost of examinations and more closely examining and supervising SLAs that impose greater risks on the FSLIC (as is discussed below) would be one way to charge risk-related insurance premiums. (It also would have the advantage of providing the FHLBB with the funds to carry out its supervisory responsibilities.) Requiring higher levels of equity and/or subordinated debentures can be helpful in providing self-control by SLA managers. As is discussed next, to be reasonably effective, these procedures would require better information than the authorities now have or appear to want.[2]

Accounting and Reporting

While RAP accounting makes it possible for the FHLBB to avoid recognizing the losses which have occurred and eventually will be charged against the United States budget, it also obscures from the FHLBB the economic condition of deposit-insured institutions. One compensation by the FHLBB appears to have been the adoption of the dysfunctional direct investment regulation, which seems directed at making SLAs use a form of market-value accounting for low-borrower-equity ADC loans. A much preferable alternative would be to require SLAs to use market-value accounting for all their assets and liabilities. At the least, generally accepted accounting principles (GAAP) should replace RAP, and market value accounting should be required for ADC loans or any other type of asset about which the FHLBB is concerned.

Because market-value accounting is not well developed and is subject to interpretive difficulties, it should not be required for public reports. However, the FHLBB could require supplementary market value reports. Furthermore, current (monthly or even weekly) reporting of sensitive items could be required.[3] These alternatives are preferable to rules restricting SLAs' activities.

Supervision

Logic and studies (including the present one) indicate that opportunistic and fradulent behavior can be expected from some SLA managers and owners. Federal deposit insurance shields most depositors from concern about the risk or caution with which institutions holding their funds are operated. Hence, bankers are protected from this aspect of market discipline. In addition to changing the way deposit insurance is priced, the deposit insurance authorities must supervise more effectively the operations of institutions with deposit insurance.

Improved supervision should not include restrictions on the assets in which institutions can invest or activities they can undertake, because the authorities cannot structure rules that would be sufficient to constrain excessive risk-taking or fraud. SLAs that want to take risks can invest in fixed-interest long-term U.S. government or mortgage-backed bonds, and gamble that interest rates will decline more than expected. They can buy or sell interest rate futures and options. They can make ADC or other real-estate loans and mortgages that offer high up-front fees and points but are structured to allow recording as loans rather than as "direct investments." They can invest in high-interest, high-risk (junk) bonds. They can make fixed-interest-rate mortgages that are funded with short-term liabilities, as they did before the present debacle and as they appear to be doing again.

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[2] Risks in banking, deposit insurance, and proposals for reform are discussed much more fully in Benston, Eisenbeis, Horvitz, Kane, and Kaufman (1986).

[3] See Benston, Eisenbeis, Horvitz, Kane, and Kaufman (1986) Chapter 9 for a further discussion.

SLA managers and owners who want to defraud the FSLIC can make mortgages that exceed market values on properties owned by confederates or in exchange for side payments; sloppy or fraudulent appraisals can be used to support such loans. Managers and owners who want to take a big one-time gamble can offer above-market rates for funds either by means of direct solicitation or through brokers. Although the increase in liabilities would violate the FHLBB's growth regulation, the gamble might pay off or the fraud be completed before the SLA files quarterly reports and the FHLBB acts on the information.

In short, rules cannot be an alternative to effective supervision. Such supervision should include the following: (1) frequent reporting of items of concern (including market values of assets and liabilities); (2) use of statistical models (such as those employed in Chapter I) to direct supervisory and examination resources to institutions that have higher probabilities of failure; (3) prompt action (including use of the FHLBB's present power to issue cease-and-desist orders) to constrain an FSLIC-insured institution that is being operated in a reckless or possibly fraudulent manner from obtaining additional funds, particularly if it undercapitalized (in terms of market value); and (4) closure or very close supervision of institutions with negative economic net worth—if it is politically feasible to recognize the economic losses that have already occurred, it would be preferable to auction these institutions or their individual assets and deposit accounts to the highest bidder, consistent with the ability of the bidder to pay the FSLIC as promised.

D. A Final Word

The present plight of SLAs cannot be completely ameliorated. It is a consequence of past mistakes that can be undone only partially by a reversal of the initial cause—an unexpected increase in interest rates. But even were interest rates to decrease to a pre-inflation level, many SLAs would continue to be economically insolvent. The market value of their mortgages and other fixed-rate obligations would return to par, which would be of considerable benefit, but for many institutions this return to an equivalence of economic and book values would be insufficient to repair past damage. Nor could these (and other) SLAs expect to earn higher-than-market returns on the mortgages they made in the high-interest-rate years. Many (perhaps most) high-fixed-rate mortgagors would refinance at the lower rates, and earnings on ARMs would decline. Thus, more official failures are likely to occur, no matter what course is followed. However, if the FHLBB continues on its present course, even more failures are likely, in both the short and long runs.

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